HP Integrity BL860c Server Blade User Service Guide

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About This Document

This document provides information and instructions on servicing the HP Integrity BL860c server blade.

The document publishing date and part number indicate the document's current edition. The publishing date changes when a new edition is updated. The document part number changes when extensive changes are made.

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The latest version of this document can be found on line at http://www.hp.com/go/Blades-docs.

Intended Audience

This document is intended to provide technical product and support information for authorized service providers, system administrators, and HP support personnel.

This document is not a tutorial.

New and Changed Information in This Edition

- Updated URLs
- Updated system battery replacement instructions.

Publishing History

The publishing history below identifies the edition dates of this manual. Updates are made to this publication on an unscheduled, *as needed*, basis.

Table 1 Publishing History Details

Document Manufacturing Part Number	Operating Systems Supported	Supported Product Versions	Publication Date
AD217-9007A	HP-UX	BL860c	January 2007
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AD217-9012B	HP-UX, OpenVMS, Linux, Windows	BL860c	December 2007
AD217-9016B	HP-UX, OpenVMS, Linux, Windows	BL860c	July 2008
AD217-9016B_ed5	HP-UX, OpenVMS, Linux, Windows	BL860c	October 2008
AD217-9016B_ed6	HP-UX, OpenVMS, Linux, Windows	BL860c	February 2009
AD217-9016B_ed7	HP-UX, OpenVMS, Linux, Windows	BL860c	March 2009
AD217-9016B_ed8	HP-UX, OpenVMS, Linux, Windows	BL860c	July 2009
AD217-9016B_ed9	HP-UX, OpenVMS, Linux, Windows	BL860c	October 2009
AD217-9016B_ed10	HP-UX, OpenVMS, Linux, Windows	BL860c	October 2010
AD217-9016C	HP-UX, OpenVMS, Linux, Windows	BL860c	November 2011

Document Organization

This guide is divided into the following chapters and appendices.

Chapter 1 **Overview** Use this chapter to learn about the features and specifications of the HP Integrity BL860c server blade.

Chapter 2	**General Site Preparation Guidelines** Use this chapter to learn about the necessary steps needed to properly install your server blade in a data center. This includes environmental and facility characteristics.
Chapter 3	**Installing the Server Blade** Use this chapter to learn about installing the server blade into the enclosure.
Chapter 4	**Booting and Shutting Down the Operating System** Use this chapter to learn about booting and shutting down the operating system on the server blade.
Chapter 5	**Troubleshooting** Use this chapter to learn about troubleshooting problems you may encounter with the server blade.
Chapter 6	**Removing and Replacing Components** Use this chapter to learn how to remove and replace the various components in the server blade.
Appendix A	**Parts Information** Use this appendix to learn the location and part numbers of the server blade components.
Appendix B	**Server upgrades** Use this appendix for information about upgrading processors.
Appendix C	**Utilities** Use this appendix for information regarding the utilities available for the server blade.

Typographic Conventions

%, $, or #	A percent sign represents the C shell system prompt. A dollar sign represents the system prompt for the Bourne, Korn, and POSIX shells. A number sign represents the superuser prompt.
`Command`	A command name or qualified command phrase.
`Computer output`	Text displayed by the computer.
Ctrl+x	A key sequence. A sequence such as **Ctrl+x** indicates that you must hold down the key labeled **Ctrl** while you press another key or mouse button.
`ENVIRONMENT VARIABLE`	The name of an environment variable, for example, `PATH`.
ERROR NAME	The name of an error, usually returned in the `errno` variable.
Key	The name of a keyboard key. **Return** and **Enter** both refer to the same key.
Term	The defined use of an important word or phrase.
`User input`	Commands and other text that you type.
`Variable`	The name of a placeholder in a command, function, or other syntax display that you replace with an actual value.
[]	The contents are optional in syntax. If the contents are a list separated by `|`, you must choose one of the items.
{}	The contents are required in syntax. If the contents are a list separated by `|`, you must choose one of the items.
...	The preceding element can be repeated an arbitrary number of times.
⌷	Indicates the continuation of a code example.
|	Separates items in a list of choices.
WARNING	A warning calls attention to important information that if not understood or followed will result in personal injury or nonrecoverable system problems.

CAUTION	A caution calls attention to important information that if not understood or followed will result in data loss, data corruption, or damage to hardware or software.
IMPORTANT	This alert provides essential information to explain a concept or to complete a task
NOTE	A note contains additional information to emphasize or supplement important points of the main text.

HP-UX Release Name and Release Identifier

Each HP-UX 11i release has an associated release name and release identifier. The `uname 1` command with the `-r` option returns the release identifier. This table shows the releases available for the BL860c server blade.

Table 2 HP-UX 11i Releases

Release Identifier	Release Name	Supported Processor Architecture
B.11.23	HP-UX 11i v 2.0	Intel® Itanium®
B..11.31	HP-UX 11i v3.0	Intel Itanium

Related Documents

You can find other information on HP server hardware management and diagnostic support tools in the following publications.

HP Technical Documentation Website

http://www.hp.com/go/Blades-docs

Windows Operating System Information

Find information about administration of the Microsoft Windows operating system at the following website:

http://www.microsoft.com/technet/

Diagnostics and Event Monitoring: Hardware Support Tools

Complete information about HP hardware support tools, including online and offline diagnostics and event monitoring tools, is on the HP website at:

http://www.hp.com/go/hpux-diagnostics-docs

Website for HP Technical Support

http://welcome.hp.com/country/us/en/contact_us.html

Books About HP-UX Published by Prentice Hall

You can find the entire Prentice Hall Professional Series on HP at:

http://www.informit.com/imprint/series_detail.aspx?st=61305

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Before You Contact HP

Be sure to have the following information available before you call contact HP:

- Technical support registration number (if applicable)
- Product serial number
- Product model name and number
- Product identification number

- Applicable error message
- Add-on boards or hardware
- Third-party hardware or software
- Operating system type and revision level

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- In other locations, see the Contact HP worldwide (in English) webpage: http://welcome.hp.com/country/us/en/wwcontact.html.

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- In the United States, for contact options see the Contact HP United States webpage: (http://welcome.hp.com/country/us/en/contact_us.html)

  To contact HP by phone:

  - Call 1-800-HP-INVENT (1-800-474-6836). This service is available 24 hours a day, 7 days a week. For continuous quality improvement, calls may be recorded or monitored.
  - If you have purchased a Care Pack (service upgrade), call 1-800-633-3600. For more information about Care Packs, refer to the HP website: (http://www.hp.com/go/carepack).
- In other locations, see the Contact HP worldwide (in English) webpage (http://welcome.hp.com/country/us/en/wwcontact.html).

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Include the document title and manufacturing part number. All submissions become the property of HP.

1 Overview

The HP Integrity BL860c server blade is a dense, low-cost, c-Class enclosure based Intel Itanium Dual-Core processor server blade. The BL860c server blade supports the HP-UX, HP OpenVMS, Linux, and Windows operating systems. The BL860c server blade is designed for commercial server blade customers deploying c-Class blade enclosures. The BL860c server blade is consistent with other full-slot, single-width c-Class blades.

NOTE: This documentation is based on the assumption that the c-Class server blade enclosure is powered on and running properly, and that the enclosure Onboard Administrator (OA iLO) is operational.

Server Blade Overview

The server blade supports up to two Intel Itanium (200 MHz front side bus [FSB]) dual-core processors. The server blade supports up to 48 GB of memory (using twelve DDR2 4 GB DIMMs), two hot-pluggable serial-attached SCSI (SAS) disk drives, and up to three mezzanine I/O cards.

Server Blade Dimensions

Table 3 shows the dimensions and values of the server blade.

Table 3 Server Blade Dimensions and Values

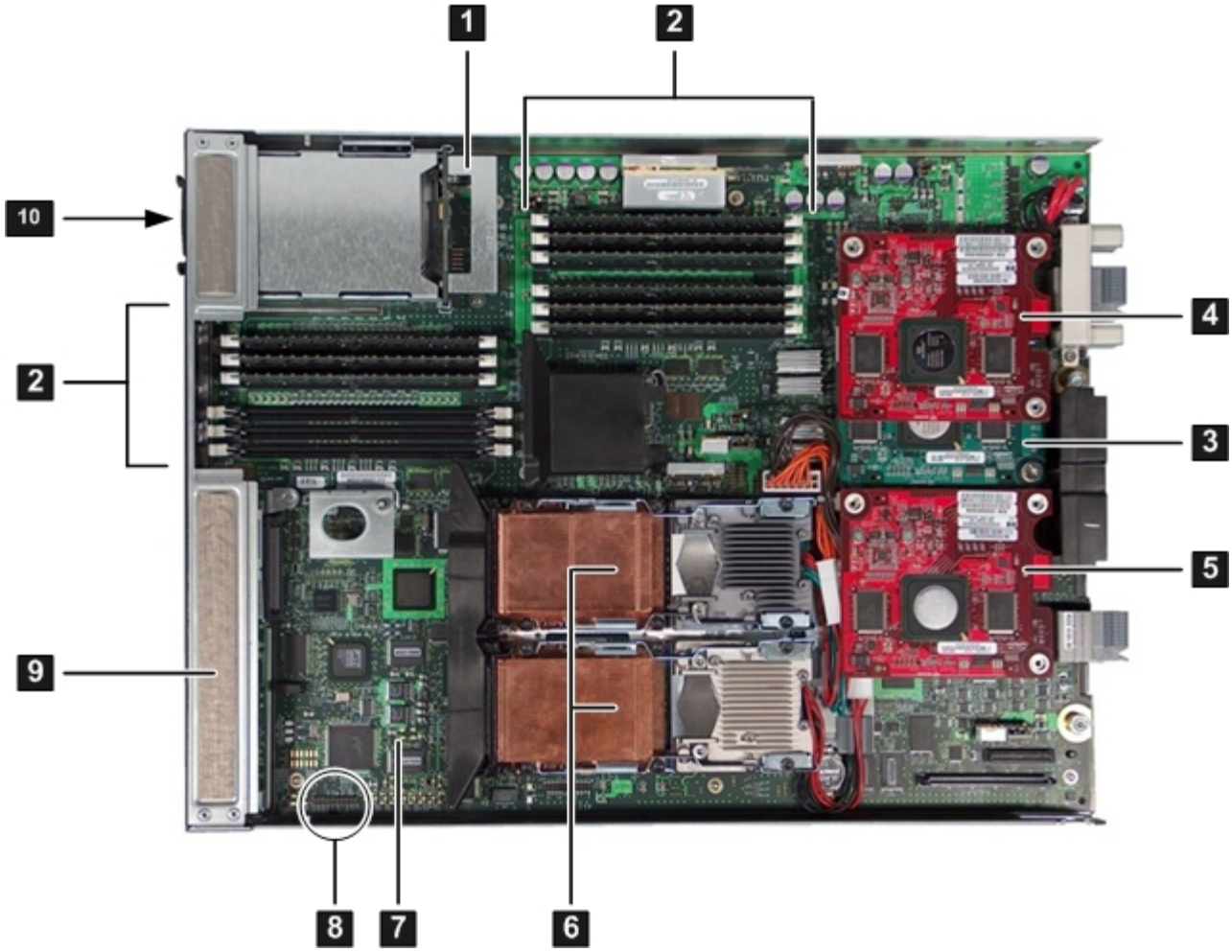
Dimensions	Values
Height	36.63 cm (14.42 in.)
Width	5.14 cm (2.025 in.)
Depth	48.51 cm (19.1 in.)
Weight	Unloaded: 8.6 kg (19 lb.) Fully loaded: 11.3 kg (25 lb.)

Server Blade Components

The following sections describe the components of the server blade.

Figure 1 shows the locations of these components in the server blade.

Figure 1 BL860c Server Blade Components



1 SAS backplane
2 DIMMs
3 Mezzanine card 1
4 Mezzanine card 2
5 Mezzanine card 3
6 Processors
7 System board
8 Trusted Platform module
9 Front display panel
10 SAS disk drives

SAS Disk Drives

There are two SAS disk drive slots on the server blade. The SAS disk drives have identical LEDs that show the drive status.

Figure 2 shows the slot numbers of the SAS hard disk drives.

Figure 2 SAS Disk Drive Slots

For the location of the SAS disk LEDs, see Figure 5.

SAS Backplane

The SAS disk backplane supports two small form factor (SFF) hard disk drives. The backplane supports hot-plugging a single SAS drive at a time. The activity LEDs and drive present LEDs shall be controlled by a preprogrammed system-on-chip (PSOC). The system board hosts the SAS controller, and supplies 12 V, 5 V, and 3.3 V standby power to the backplane. The backplane is designed as a field-replaceable unit (FRU).

The SAS backplane is connected to the system board with a right angle connector. This connector is specifically designed for high-speed differential applications, and supports server speeds exceeding 5 Gigabits per second. Power, Sense, and I^2C signals are routed through this connector as well as the SAS differential pairs and SGPIO signals.

I/O Subsystem

The I/O subsystem is composed of embedded core I/O, and up to three mezzanine cards. The server blade supports one Type I and two Type II mezzanine cards (with PCI express links that serves as a bridge between the zx2 ropes links and PCIe). The server blade does not support PCI Hot Plug (PHP).

Memory controllers are used as the ropes to the PCI bridge for the system board fast and slow core I/O. The server blade uses two memory controllers to interface with the Core LAN and SAS. The memory controllers run at 33 MHz and interface with the manageability, USB, and graphics through the serial, USB, and video (SUV) cable. The serial, USB, and video are provided through the PCI devices attached to logical rope 0.

PCIe MPS Optimization

For PCIe-based systems, each PCIe device has a configurable maximum payload size (MPS) parameter. Larger MPS values can enable the optimization to gain higher performance. MPS Optimization is supported on PCIe systems running HP-UX, Open VMS, and Linux. System firmware level greater than 01.01 performs an optimization during boot time to set the MPS value to the largest size supported by the PCIe root port and the devices below it.

The default server state is optimization disabled. When disabled, system firmware sets MPS to the minimum value on each PCIe device.

The `info io` command displays the current PCIe MPS optimization setting. See Table 31 (page 153).

To enable PCIe MPS optimization use the `ioconfig mps_optimize` command. See "ioconfig" (page 165).

For non-PCIe systems, **`ioconfig`** and **`info io`** will not display the MPS optimization policy setting. The Set PCIe MPS Optimization boot manager menu also will not be displayed. Running the `ioconfig mps_optimize [on|off]` command from a non-PCIe system, displays the following output:

```
-------------
Shell> ioconfig mps_optimize
ioconfig: PCIe MPS optimization is not supported.

Shell> ioconfig mps_optimize on
ioconfig: PCIe MPS optimization is not supported.
Exit status code: Unsupported

Shell>
-----------------
```

To restore MPS to the default values, enter the `default clear` command.

PCI Expansion Blade

If you need additional PCI-X/PCIe cards for your server blade, you can install a PCI expansion blade. The PCI expansion blade holds up to one or two PCI-X or PCIe cards. However, you cannot mix PCI-X and PCIe cards in the PCI expansion blade.

The PCI expansion blade **must** be installed adjacent to the server blade you are installing for it to connect to the server blade properly.

For more information about the PCI expansion blade, see http://h18004.www1.hp.com/products/blades/expansion/index.html?jumpid=reg_R1002_USEN.

Memory Subsystem

The server blade physical memory subsystem includes PC2-4200 Double Data Rate Synchronous Dynamic Random Access Memory (DDR2 SDRAM) DIMMs, as well as the memory bus traces, and required termination. The memory subsystem supports only DDR2 SDRAM technology using industry-standard PC2-4200 DIMMs. The DIMMs use a 184-pin JEDEC standard connector. The server blade memory subsystem provides two memory cells. Each cell is 144 bits wide (128 bits of data, 16 bits of ECC), and has six DIMM slots for a total of 12 slots (six DIMMs per cell). All 12 DIMM slots are shared by both processors.

The minimum amount of memory supported in the server blade is 1 GB (two 512-MB DIMMs).

The maximum amount of memory supported in the server blade is 96 GB (twelve 8-GB DIMMs).

The DIMMs used in the server blade are low-profile (1.2" tall) DIMMs. The DIMMs are standard PC2-4200 registered. Only HP qualified DIMMs are supported.

DIMMs

The memory subsystem supports only DDR2 SDRAM technology utilizing industry-standard 1.2" high DIMMs. The DIMMs use a 184-pin JEDEC standard connector. You must install the DIMMs in pairs. To enable chip sparing, install the DIMM in pairs. Both DIMMs must be the same capacity. Table 4 summarizes the server blade memory configurations.

Table 4 Server Blade Memory Array Capacities

Min / Max Memory Size	Single DIMM Sizes
1 GB / 6 GB	512 MB
2 GB / 12 GB	1 GB

Table 4 Server Blade Memory Array Capacities *(continued)*

Min / Max Memory Size	Single DIMM Sizes
4 GB / 24 GB	2 GB
8 GB / 48 GB	4 GB

NOTE: Installing DIMMs as a pair (two identical DIMMs) enables lock-step mode and chip sparing.

Install DIMMs from highest capacity to lowest capacity (for example, install the 4-GB DIMMs first, then the 2-GB DIMMs, then the 1-GB DIMMs, and so forth).

For more information, see "Removing and Replacing DIMMs" (page 114).

Add-On Memory

To locate the HP part number, look at the HP Security/CT Label located on the DIMM.

AD344A (2 x 2 GB DIMMs) memory with the HP part number AB565DX cannot be mixed on the same physical rank as 2 GB memory with the AB565CX, AB565BX, or AB565AX HP part number.

IMPORTANT: Earlier versions of system firmware do not support the installation of this replacement memory and can result in de-allocation of the entire quad or pair.

Firmware Updates

HP Integrity BL860c server blades require system firmware version 03.02 or later to support the following Memory Add-On products:

- AD343A 2 GB DDR2 Memory Pair (2 x 1 GB DIMMs)
- AD344A 4 GB DDR2 Memory Pair (2 x 2 GB DIMMs)
- AD345A 8 GB DDR2 Memory Pair (2 x 4 GB DIMMs)

Before installing any of these memory products, verify the server firmware version is equal to or higher than the version listed above for your product. On HP Integrity servers, you can determine the firmware version using the following EFI Shell `info fw` command:

```
Shell> info fw

FIRMWARE INFORMATION

*System Firmware A Revision: 3.02 [4819]

 System Firmware B Revision: 3.02 [4819]

 BMC Revision: 5.20

 Management Processor Revision: T.02.17

 Updatable EFI Drivers:
   Floating Point Software Assistance Handler: 00000118

   Broadcom Gigabit Ethernet Driver: 00090404

   SCSI Bus Driver: 00000031

   SCSI Disk Driver: 00000020

   SCSI Tape Driver: 00000030

   Usb Ohci Driver: 00000040

   USB Bus Driver: 00000020
```

```
USB Bot Mass Storage Driver: 00000020

Generic USB Mass Storage Driver: 00000020

CLPrelay App: 00000100
```

* Indicates active system firmware image. In this case =>3.02 indicates that this server does not need system firmware updated to use the memory modules described in this document.

The firmware upgrade instructions are included in the Release Notes on the firmware package download page for your server product. To locate the Release Notes and download the firmware:

1. Go to http://www.hp.com/bizsupport.
2. Select **Download Drivers and Software**.
3. Select **HP Integrity Servers**.
4. Select the link for your server product.

After the firmware has been downloaded, you can install the memory. To install DIMMs, see "Installing DIMMs" (page 32).

Power Subsystem

The power subsystem is located on the system board. Each server blade receives bulk DC voltage from the enclosure. The server blade power block converts the DC voltage from the enclosure to the voltage required by the server blade. The server blade receives 12 V directly from the enclosure. The voltage passes through E-Fuse circuitry that resides in the blade. The 12 V supply is always on as long as a power supply is installed in the enclosure. A control line from the enclosure onboard administrator (OA) can turn the E-Fuse on or off to supply or cut power to the blade. The 12 V gets distributed to various point-of-load (POL) converters. The switched POL voltage rails are: 0.9 V, 1.2 V, 1.5 V, 1.8 V, 2.5 V, 3.3 V, 5.0 V, 3.3 V standby, and 5.0 V standby.

Processor and Core Electronics Complex

The processor subsystem holds one or two Intel Itanium dual-core processor modules. It consists of the zx2 core electronics complex (CEC), a front side bus, a memory and I/O controller, system clock generation and distribution, multiple POL converters, and I^2C circuitry for manageability and fault detection.

The front side bus speed is 267 MHz. The zx2 CEC and the processor modules are located on the system board. A Zero Insertion Force (ZIF) socket connects the processors to the system board. Heatsinks, processor metal frames, and bolster plates are part of the mechanical attach requirements for the processors and the zx2.

Enclosure Information

This installation document covers only the HP Integrity BL860c server blade, and does not include specific server blade enclosure information. For the server blade c-Class enclosure information, see http://h71028.www7.hp.com/enterprise/cache/316735-0-0-0-121.html.

Controls, Ports, and LEDs

This section describes the controls, ports, and LEDs found on the front panel and rear panel of your HP Integrity server blade.

For more information on LED functions and descriptions, see Chapter 5: "Troubleshooting" (page 86).

Front Panel View

The server blade has seven server LEDs, one Power button, two Reset buttons, SAS disk drive LEDs and one front panel port that accepts the serial, USB, video (SUV) cable for configuration and troubleshooting. Figure 3 shows the LEDs, ports, and controls on the front panel of the server blade.

Figure 3 Server Blade Front View

1 SAS disk drives
2 Front panel LEDs
3 Power button
4 Blade extraction handle
5 SUV cable port

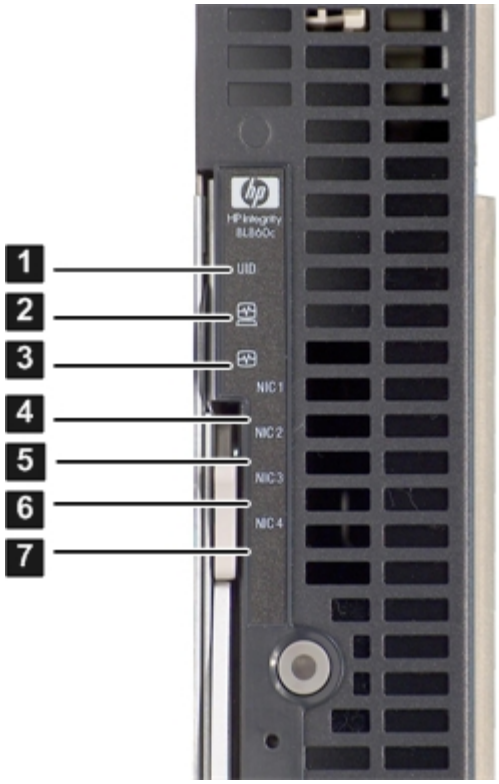
△ **CAUTION:** Disconnect the local I/O cable from the I/O port when not in use. The connector is not designed to provide a permanent connection.

Front Panel LEDs

The server blade contains seven LEDs on the front panel that indicate the server status.

Figure 4 shows the front panel LEDs.

Figure 4 Front Panel LEDs on the Server Blade



1 UID LED
2 Server health LED
3 Internal health LED
4 NIC 1 LED
5 NIC 2 LED
6 NIC 3 LED
7 NIC 4 LED

Table 5 details the functions of the front panel LEDs.

Table 5 BL860c Server Blade Front Panel

Item	LED Description
1	Unit identification (UID)
2	Server health
3	Internal health
4	NIC 1
5	NIC 2
6	NIC 3
7	NIC 4

SAS Disk Drive LEDs

There are two SAS disk drives on the server blade. They have identical LEDs that show the drive status.

Figure 5 shows the locations of the SAS disk drive LEDs.

Figure 5 SAS Disk Drive LEDs

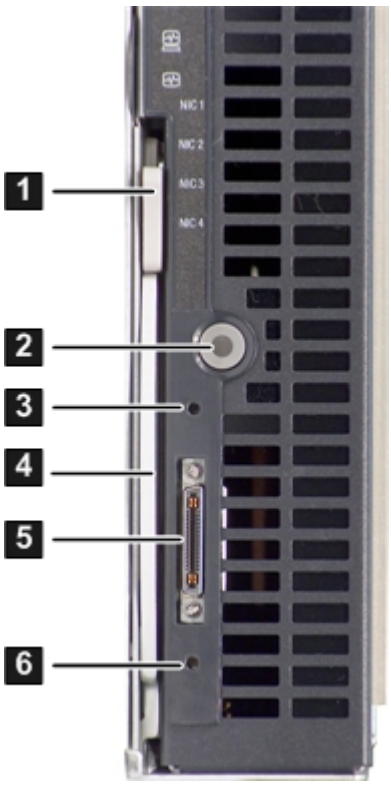
1 Activity LED
2 Status LED

Controls and Ports

The following section identifies the locations and functions of the front panel controls and ports.

The Power button, and server blade extraction lever, and the SUV cable port are located on the front of the server. For more information about the Power button and server blade power states, see "Server Power States" (page 39).

Figure 6 Front Panel Controls and Ports



1 Extraction lever release button
2 Power button
3 iLO 2 MP reset pinhole button
4 Extraction lever
5 SUV port
6 Init (ToC) pinhole button

SUV Cable and Ports

The server blade has an SUV port used by the SUV cable. This port is located on the front of the server blade. Figure 6 (page 22) shows the location of the SUV port. The SUV cable connects the server to external devices, such as: a terminal emulator, an external DVD drive, or a monitor. Figure 7 shows the ports on the SUV cable.

CAUTION: The SUV cable is not designed to be used as a permanent connection.

Use caution when walking near the server blade when the SUV cable is installed. Hitting or bumping the cable can cause the port on the server blade to break. This can damage the system board, which will then need to be replaced.

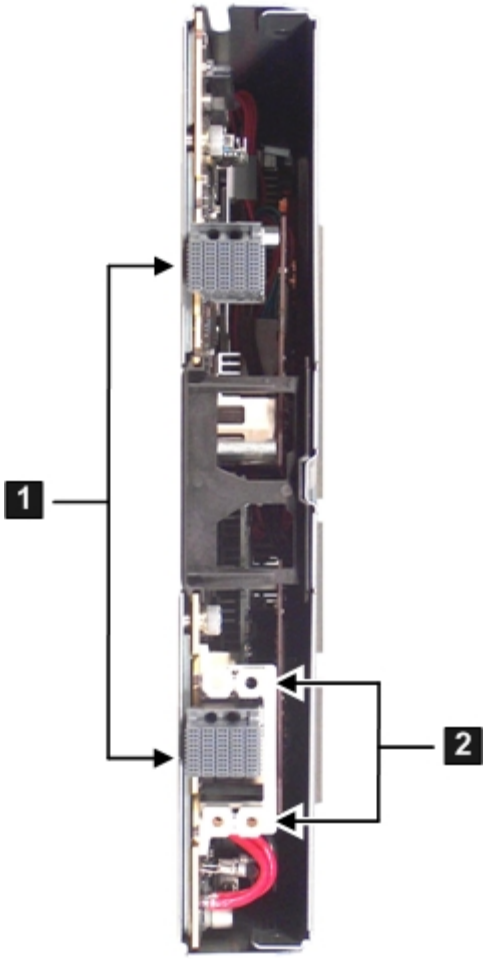
Figure 7 SUV Cable Ports

1 Serial port
2 USB ports (2)
3 Video port

Rear Panel View

Figure 8 shows the server blade rear panel ports.

Figure 8 BL860c Server Blade Rear Panel Ports



1 GBX signal connector

2 Power connector

2 General Site Preparation Guidelines

The HP Integrity BL860c server blade does not have cooling or power systems as part of the server blade. Cooling and power is provided by the c-Class enclosure. Therefore, the server blade power, cooling, and site specifications are included in the c-Class enclosure documentation.

For more information on the c-Class enclosures, see: http://h71028.www7.hp.com/enterprise/cache/316735-0-0-0-121.html.

For more site preparation information, see the HP website and search for Generic Site Preparation Guidelines.

3 Installing the Server Blade Into the Enclosure

This chapter covers the procedures for installing the server blade into a c-Class enclosure.

Safety Information

When removing and replacing server components, use care to prevent injury and equipment damage . Many assemblies are sensitive to damage by electrostatic discharge.

Follow the safety precautions listed below to ensure safe handling of components, to prevent injury, and to prevent damage to the server blade:

- When removing or installing a server blade or server blade component, follow the instructions provided in this guide.
- Do not wear loose clothing that might snag or catch on the server or on other items.
- Do not wear clothing subject to static charge build-up, such as wool or synthetic materials.
- If installing an internal assembly, wear an antistatic wrist strap and use a grounding mat, such as those included in the Electrically Conductive Field Service Grounding Kit.
- Handle components by the edges only. Do not touch any metal-edge connectors or electrical components on accessory boards.

Installation Sequence and Checklist

The following is an overview of the steps to install a server blade into a c-Class enclosure, and to get the server blade running. Follow the steps shown in Table 6 to ensure a successful server installation.

Table 6 Installation Sequence Checklist

Step	Description	Completed
1	Unpack and inspect the server shipping container; inventory the contents using the packing slip.	
2	Install additional components shipped with the server.	
3	Install and power on the server blade and the PCI expansion blade (if purchased).	
4	Configure iLO 2 MP access.	
5	Access iLO 2 MP.	
6	Access EFI or OS from iLO 2 MP.	
7	Download and install the latest firmware bundle from the HP support website.	
8	Install and Boot the OS.	

Unpacking and Inspecting the Server Blade

This section describes procedures performed before installation. You must ensure that you have adequately prepared your environment for your new server, received the components that you ordered, and verified that the server and its containers are in good condition after shipment.

Verify Site Preparation

Verifying site preparation is an essential factor of a successful server installation, and includes the following tasks:

- Gather LAN information. Determine the two IP addresses for the Integrated Lights Out 2 Management Processor (iLO 2 MP) LAN and the server blade LAN.
- Establish a method to connect to the server console. For more information on console connection methods, see Section : "Accessing the Integrated Lights Out 2 Management Processor" (page 40).
- Verify electrical requirements. Ensure that grounding specifications and power requirements are met.
- Confirm environmental requirements.

Inspect the Shipping Containers for Damage

HP shipping containers protect their contents under normal shipping conditions. After the equipment arrives, carefully inspect each carton for signs of shipping damage. Shipping damage constitutes moderate to severe damage, such as punctures in the corrugated carton, crushed boxes, or large dents. Normal wear or slight damage to the carton is not considered shipping damage. If you find shipping damage to the carton, contact your HP customer service representative immediately.

Unpack the Server Blade

To unpack a server blade:

1. Use the instructions printed on the outside top flap of the carton.
2. Remove inner accessory cartons and the top foam cushions.

IMPORTANT: Inspect each carton for shipping damage as you unpack the server.

3. Place the server blade on an antistatic pad.

Check the Inventory

The sales order packing slip lists the equipment shipped from HP. Use this packing slip to verify that the equipment has arrived.

NOTE: To identify each item by part number, see the sales order packing slip.

Damaged Equipment Returns

If the equipment is damaged, immediately contact your HP customer service representative. The service representative initiates appropriate action through the transport carrier or the factory and assists you in returning the equipment.

Installing Additional Components

This section describes the installation of components that are not installed at time of delivery. If your server blade has no additional components to install, go to "Installing and Powering On the Server Blade" (page 38).

Service Tools Required

Service of this product can require the following tools:

- An IPF Processor Install Tool Kit, consisting of:
  - Disposable ESD Kit
  - Processor installation tool (2.5 mm hex and Torx 15 screwdriver)

NOTE: If you purchased an additional processor, the IPF Processor Install Toolkit is included with the processor.

The server blade has a Torx T–15 screwdriver mounted on the inside of the access panel.

Adding a Hot-Plug SAS Disk Drive

Use the following procedures if the server blade has a disk drive blank installed and you need to install a hot-plug SAS disk drive.

For a list of supported SAS disk drives for the server blade, see: http://h18004.www1.hp.com/products/blades/components/c-class-storage.html

1. Press the release buttons simultaneously. See Figure 9.
2. Pull the blank out of the drive bay.

Figure 9 Removing a Disk Drive Blank

CAUTION: Always populate hard drive bays with either a SAS disk drive or a disk drive blank. Operating the server blade without a SAS disk drive or disk drive blank causes improper airflow and cooling that can lead to thermal damage to the server blade.

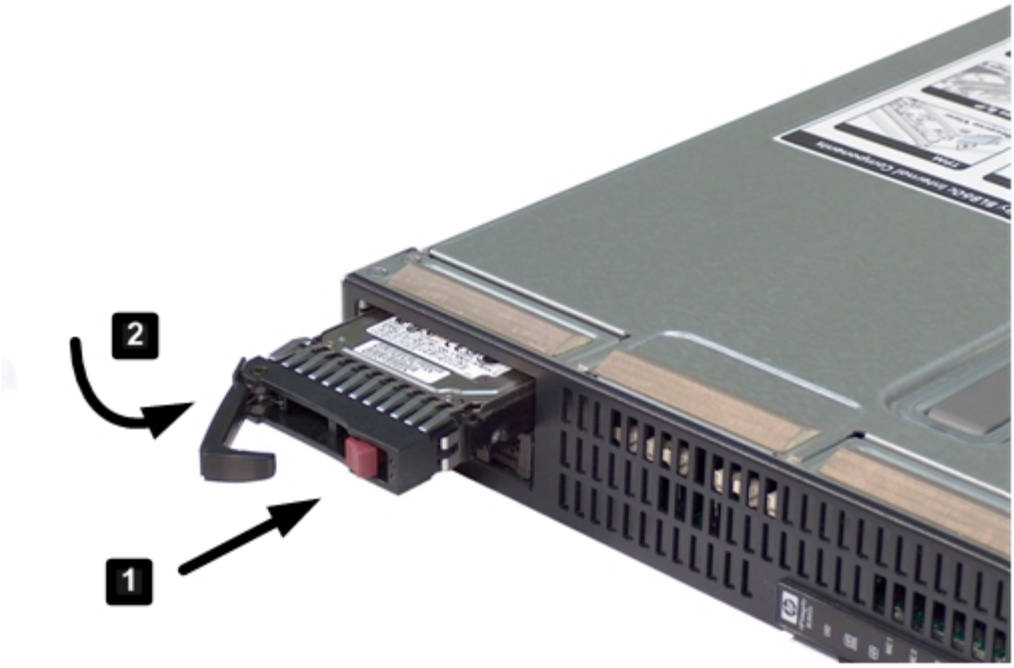
To install a SAS disk drive:

1. Slide the drive into the cage until it is fully seated (1).

   See Figure 10.

2. Close the lever to lock the drive into place (2).

Figure 10 Installing a Hot-Plug SAS Disk Drive



Installing Internal Components

Use these procedures to install internal components that were not installed into your server blade. Before you can install the internal components, you must remove the access panel.

Removing the Access Panel

To remove the access panel:

1. Unlock the cam on the access panel latch (if necessary) by turning the lock on the access panel latch counter-clockwise with a Torx T-15 or flathead screwdriver. See Figure 11.
2. Pull up on the access panel latch (1). This causes the access panel to slide back about 2 cm (0.75 in).
3. Remove the access panel by lifting it straight up and off the server blade (2).

Figure 11 Removing the Server Blade Access Panel

After the access panel is off, you can do the following:

- Add an additional processor.
  See "Installing a Processor" (page 30).
- Add additional memory DIMMs.
  See "Installing DIMMs" (page 32).
- Add additional mezzanine cards.
  See "Installing Mezzanine Cards" (page 33)

Installing a Processor

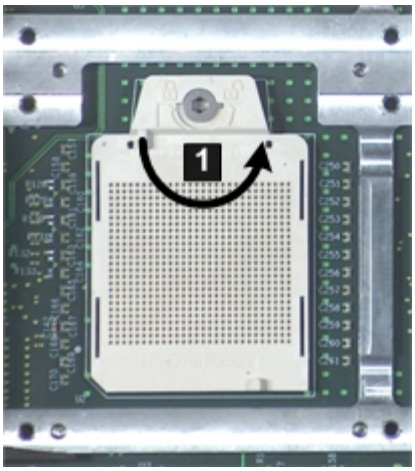
Use this procedure to install an additional processor into the server blade.

To install a processor:

1. Remove the dust cover from the empty processor 1 slot on the system board (if necessary).
2. Make sure the ZIF socket lock for the empty processor 1 slot on the system board is unlocked by turning the cam counter-clockwise 180 degrees with the processor installation tool (1).

   If the socket lock does not turn, the socket is open and ready for the processor to be installed. Figure 12 shows the ZIF socket lock in the unlocked position.

Figure 12 Unlocked ZIF Socket

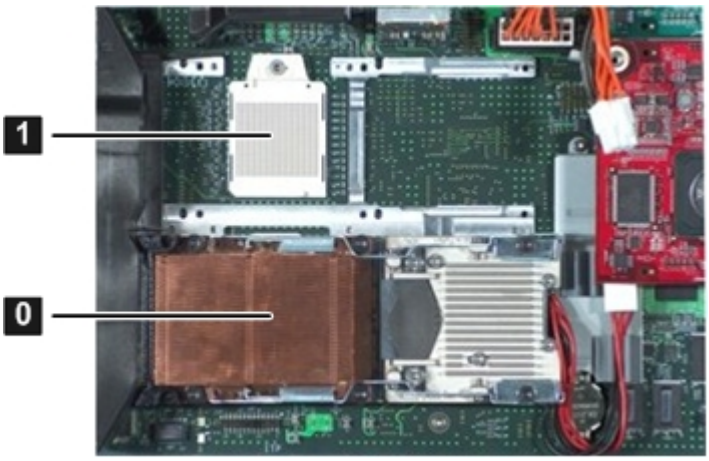


CAUTION: Do not tighten the ZIF socket lock more than 180 degrees in either direction. This severely damages the socket and processor, and renders the processor slot unusable.

3. Install the processor into processor slot 1 on the system board by lining up the alignment pins on the processor with the holes in the processor slot.

NOTE: Processor 0 is already installed in the server blade. See Figure 13 for slot locations on the server blade system board.

Figure 13 Processor Slot Identification



1 Processor slot 0 (filled)

2 Processor slot 1 (empty)

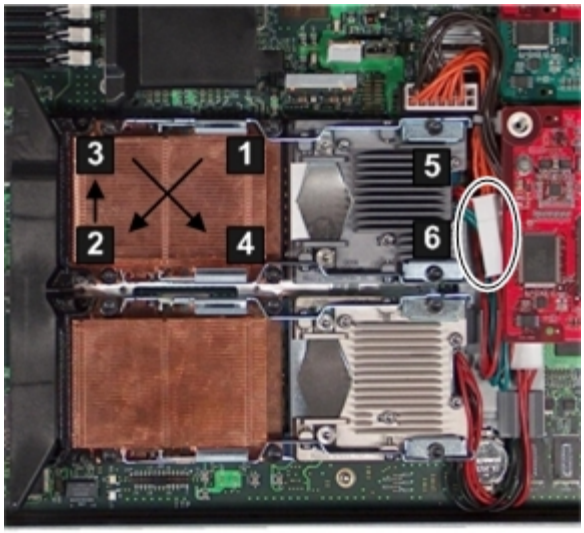
4. Ensure the processor is seated correctly by pressing down gently on the processor. The processor should not move, or rock back and forth. Reseat the processor if necessary.
5. Tighten the ZIF socket lock by turning the lock 180 degrees clockwise with the processor installation tool. Press down gently on the processor when tightening the ZIF socket to ensure the lock engages properly.

CAUTION: Do not tighten the ZIF socket lock more than 180 degrees in either direction. This severely damages the socket and processor, and renders the system board unusable.

6. To tighten the captive shoulder screws 1 through 4 on the processor, tighten them 2 full turns once they engage the threads. When all four shoulder screws are engaged, tighten them in the order shown in Figure 14 with the Torx T-15 screwdriver.

7. Tighten the captive screws (5 – 6) on the processor with the Torx T-15 screwdriver until snug

Figure 14 Installing a Processor on the Server Blade System Board



8. Connect the power cable to the processor power connector using the clips shown circled in Figure 14 (page 32).

If you are only adding a processor to your server blade, and not adding memory DIMMs or mezzanine cards, go to "Replacing the Access Panel" (page 37). If you are adding DIMMs, go to "Installing DIMMs" (page 32). If you are adding mezzanine cards, go to "Installing Mezzanine Cards" (page 33).

Installing DIMMs

There are 12 DIMM slots located on the system board. These DIMM slots are designated in six ordered pairs; 0A – 0B, 1A – 1B, 2A – 2B, 3A – 3B, 4A – 4B, and 5A – 5B. For DIMM slot locations, see Figure 15. This is also the install order. DIMM sizes within each pair must match.

The server blade uses a minimum of 1 GB of memory (two 512–MB DIMMs), and a maximum of 96 GB of memory (twelve 8–GB DIMMs). If you purchased additional memory, use these procedures to install more memory into your server blade.

Install DIMMs from highest capacity to lowest capacity (for example, install 8-GB DIMMs first, then 4-GB DIMMs, then 2-GB DIMMs, and so forth).

The memory subsystem supports chip spare functionality. The DIMM pairs must be identical to allow chip sparing. If a multibit error occurs on an SDRAM, chip sparing allows that SDRAM to be bypassed (logically replaced) on that DIMM.

To allow chip sparing functionality, use only HP DIMMs with the same part number.

The install order for the DIMM pairs is as follows:

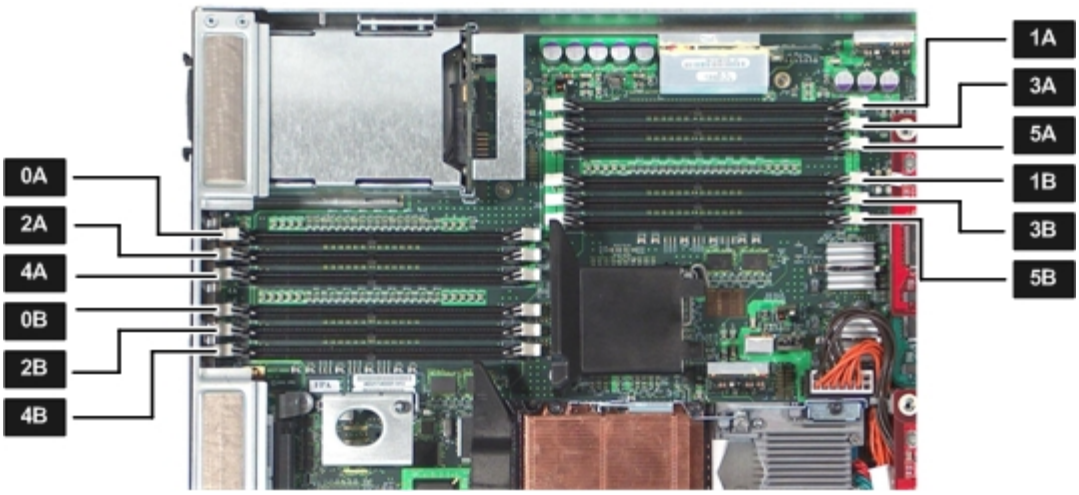
1. Slots 0A and 0B.
2. Slots 1A and 1B.
3. Slots 2A and 2B.
4. Slots 3A and 3B.
5. Slots 4A and 4B.
6. Slots 5A and 5B.

To install additional memory DIMMs into the server blade:

1. Locate the DIMM slots on the server blade system board.
   See Figure 15.

NOTE: The server blade ships with at least two DIMMs installed in slots 0A and 0B.

Figure 15 DIMM Slot Locations



2. Ensure the DIMM slot latches are open.

CAUTION: Use only HP low profile (1.2 in.) DIMMs. DIMMs from other sources might adversely affect data integrity.

DIMMs do not seat fully if turned the wrong way.

DIMMs in a pair must be identical.

3. Insert a DIMM in a slot and push down firmly until the latches click shut.

Installing Mezzanine Cards

The server blade has three ports for mezzanine cards on the system board. These cards provide I/O capabilities for the server blade. The server supports one Type I mezzanine card, and two Type II mezzanine cards.

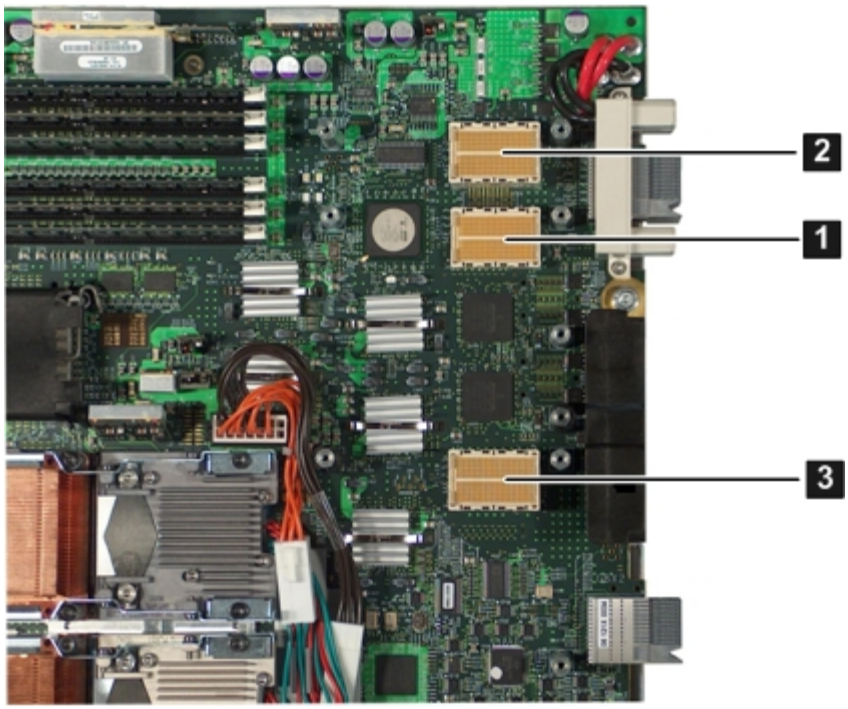
- The Type I mezzanine port supports an Intel PCIe x4 card
- The Type II mezzanine ports support Intel PCIe x8 cards

For more information regarding the different cards supported by the BL860c server blade, see http://h71028.www7.hp.com/enterprise/cache/316682-0-0-0-121.html?jumpid=reg_R1002_USEN.

The available power rails for the mezzanine cards are 12 V, 3.3 V, and 3 V auxiliary, with a total power of 25 W for each card.

Figure 16 shows the mezzanine port locations on the system board.

Figure 16 Mezzanine Port Locations on the System Board



1 Mezzanine port 1: PCIe x4 port
2 Mezzanine port 2: PCIe x8 port
3 Mezzanine port 3: PCIe x8 port

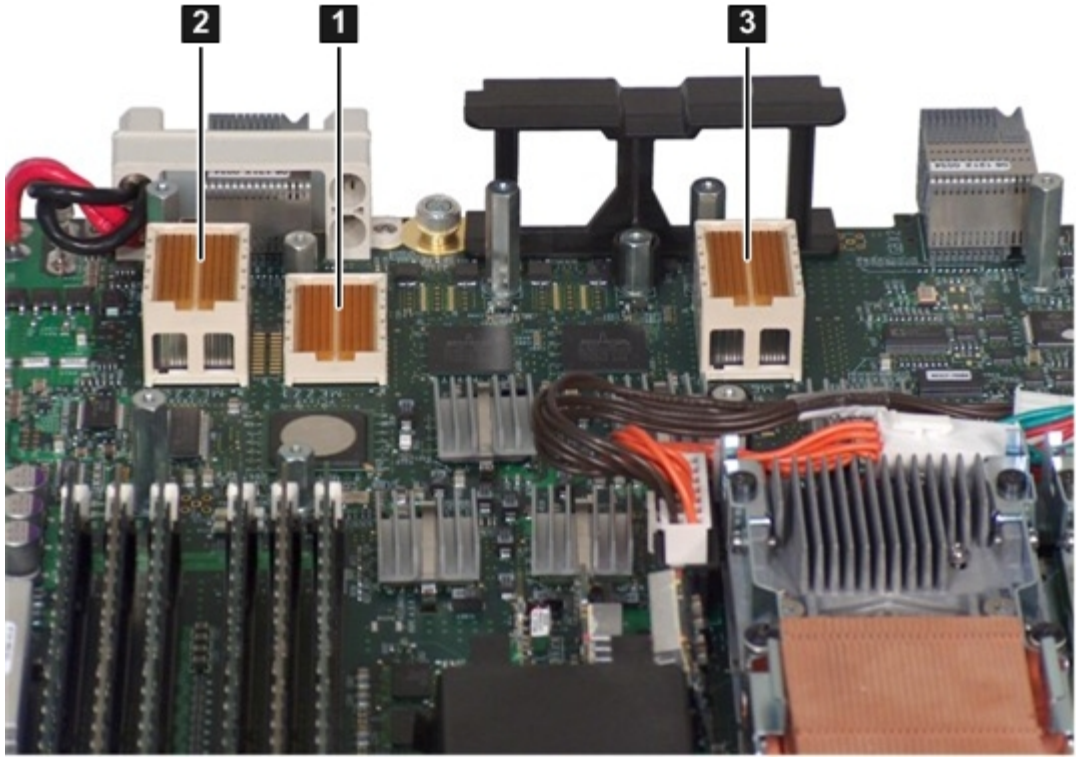
The install order for the mezzanine cards is:

1. PCIe x4 card – Install into mezzanine port 1
2. PCIe x8 card – Install into mezzanine port 2
3. PCIe x8 card – Install into mezzanine port 3

If you are only loading PCIe x8 cards, install them into port 2, then port 3.

Mezzanine port 1 is lower than mezzanine ports 2 and 3 to allow the cards to be stacked on top of each other. Figure 17 shows the mezzanine port heights.

Figure 17 Mezzanine Port Heights



Installing a Mezzanine Card in Port 1

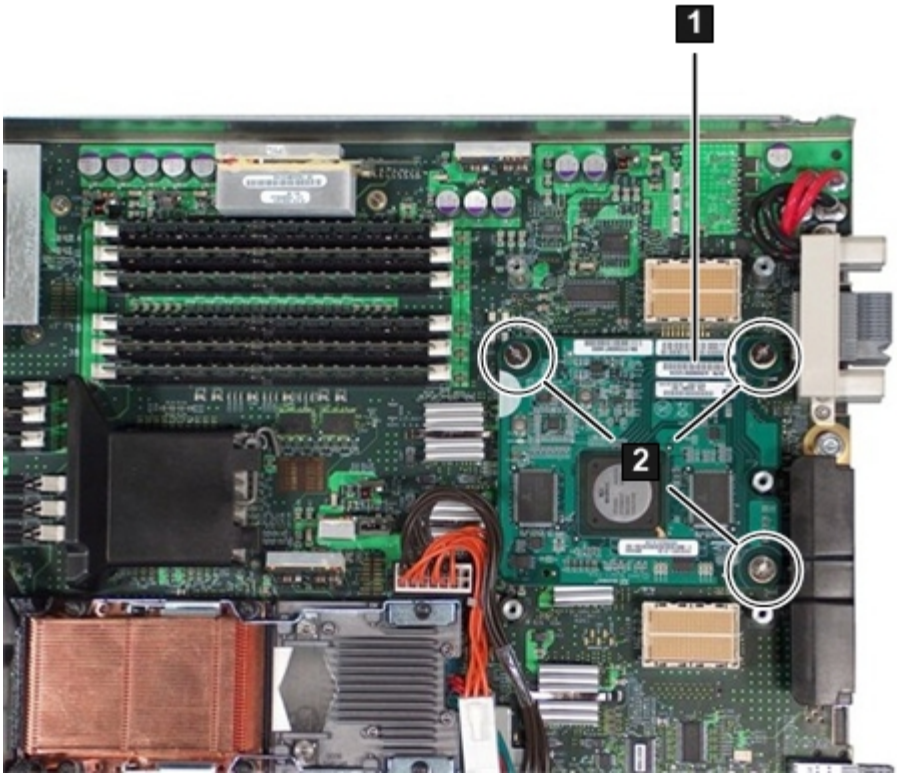
To insert a mezzanine card into the PCIe x4 port 1 on the system board:

1. Line up the plastic pins on the mezzanine card connector with the PCIe x4 port on the system board.
2. Push down on the card directly above the port to seat the card into the port (1).

3. Tighten the thumbscrews on the mezzanine card until snug to secure the card to the system board (2).

   See Figure 18.

Figure 18 Mezzanine Card 1 Installed on the Server Blade System Board



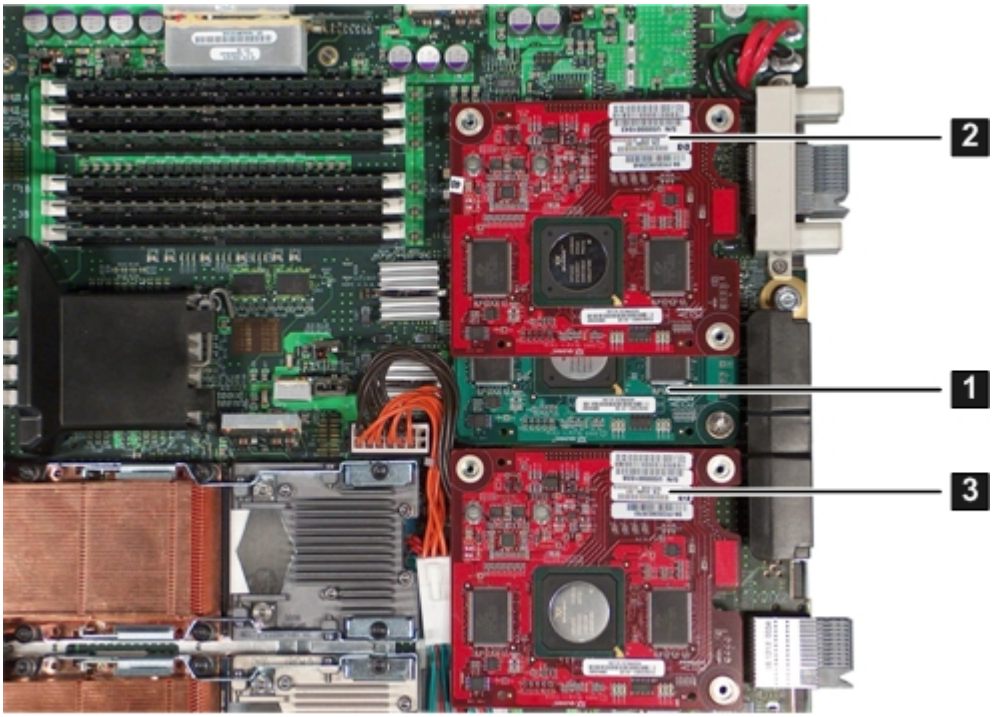
Installing a Mezzanine Card to Ports 2 and 3

To insert a mezzanine card into the PCIe x8 ports 2 and 3 on the system board:

1. Line up the plastic pins on the mezzanine card connector on the PCIe x8 port 2 on the system board.
2. Push down on the card directly above the port to seat the card into port 2
3. Tighten the thumbscrews on the mezzanine card until snug to secure it to the system board.
4. Line up the plastic pins on the mezzanine card connector on the PCIe x8 port 3 on the system board.
5. Push down on the card directly above the port to seat the card into port 3.

6. Tighten the thumbscrews on the mezzanine card until snug to secure it to the system board. Figure 19 shows all three mezzanine cards installed on the server blade system board.

Figure 19 Mezzanine Cards 2 and 3 Installed on the Server Blade System Board



1. Mezzanine card 1 (PCI–e x4)
2. Mezzanine card 2 (PCI–e x8)
3. Mezzanine card 3 (PCI–e x8)

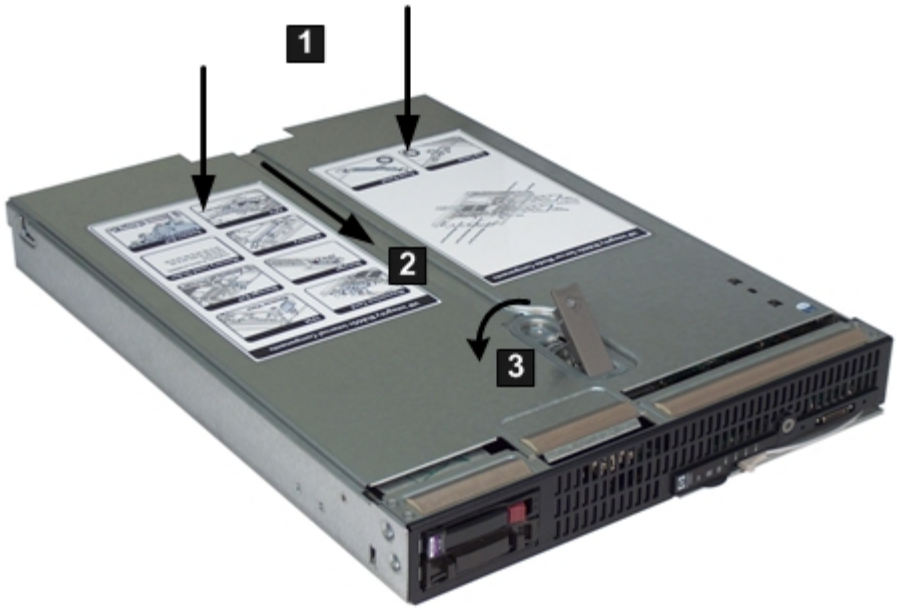
Replacing the Access Panel

To replace the access panel:

1. Make sure the access panel latch is in the open position (pointing up).

   See Figure 20 (page 38).
2. Place the access panel onto the server blade by lining up the posts on each side of the access panel with the keyways on the server blade chassis (1).
3. Slide the access panel toward the front of the server blade (2), and push down on the access panel latch until it is flush with the access panel (3).

Figure 20 Replacing the Access Panel



4. Lock the access panel cam (if necessary) by turning the cam clockwise with the Torx T–15 or flathead screwdriver.

Installing and Powering On the Server Blade

This section describes how to install the server blade into a standard c-Class enclosure and power it on. When you install the server blade into the enclosure, the server blade powers up to standby mode.

Installing the Server Blade into the c-Class Enclosure

To install the server blade into a standard c-Class enclosure:

1. Remove the two half-height filler panels from the enclosure (if necessary).
2. Remove the half-height blade shelf (if necessary).
3. Ensure the extraction lever is released (open) on the server blade.
4. Slide the server blade into the enclosure.

   See Figure 21.

5. Close the extraction lever (2).

   The server blade should come up to standby power. The server blade is at standby power if the server health LED is amber.

IMPORTANT: If the server health LED turns green, and the fan noise gets louder, then the server blade has powered on. Skip the rest of this procedure, and proceed to "Accessing the Integrated Lights Out 2 Management Processor" (page 40).

Figure 21 Installing a Server Blade into the Enclosure

IMPORTANT: If this server blade is being moved from one enclosure to another, run the RB command from the EFI Main Menu. This enables the server blade to obtain the new enclosure name.

Installing the PCI Expansion Blade

The PCI expansion blade **must** be installed adjacent to the server blade you are installing for it to connect to the server blade properly.

To install the PCI expansion blade into the c7000 enclosure:

1. Install PCI-X/PCIe cards into the PCI expansion server.
2. Install the PCI expansion blade into the c7000 enclosure next to the server blade you installed.

For more information about the PCI expansion blade, see http://h18004.www1.hp.com/products/blades/expansion/index.html?jumpid=reg_R1002_USEN.

Server Power States

The server blade has three power states: standby power, full power, and off. Install the server blade into the enclosure to achieve the standby power state. By default, server blades are set to

power on to standby power when installed in a server blade enclosure. Verify the power state by looking at the LEDs on the front panel, and using Table 7.

For more front panel LED information, see "Front Panel LEDs" (page 20).

Table 7 Power States

Power States	Server Blade Installed in Enclosure?	Front Panel Power Button Activated?	Standby Power Applied?	DC Power Applied?
Standby power	Yes	No	Yes	No
Full power	Yes	Yes	Yes	Yes
Off	No	No	No	No

Powering On the Server Blade

To power on the server blade after it is installed in the enclosure:

1. Ensure the server blade is in standby mode by verifying the Power button LED is amber.

   If the Power button LED is green, the server blade has full power.
2. Press the Power button momentarily to power on the server blade.

Accessing the Integrated Lights Out 2 Management Processor

When you install the server blade into the enclosure, you need to access the Integrated Lights Out 2 Management Processor (iLO 2 MP) on the server blade. To access the server blade iLO 2 MP, use the Onboard Administrator iLO (OA/iLO) port on the rear of the enclosure, or the RS-232 port on the SUV cable. Use the server blade iLO 2 MP for advanced troubleshooting, diagnostics, and the initial network configuration of the server blade. There are two methods to access the iLO 2 MP. Each way depends on how your server blade enclosure is set up at installation:

- If the OA iLO port on the enclosure is connected to the local network that has a DHCP server, your iLO 2 MP IP address is generated by the DHCP server.

  To access the iLO 2 MP through a DHCP server, see "Accessing the iLO 2 MP with DHCP Enabled" (page 40).
- If the enclosure is not connected to a network, you must configure your server through the serial port on the SUV cable.

To access the iLO 2 MP without a network connection, see "Accessing the iLO 2 MP with No Network Connection" (page 42).

DHCP is default-enabled on the server blade.

To perform these procedures, the server blade enclosure must be powered on and operating correctly.

Throughout this procedure, there are references to the OA/iLO and iLO 2 MP:

- OA/iLO refers to the enclosure Onboard Administrator iLO.
- iLO 2 MP refers to the server blade iLO 2 Management Processor.

Accessing the iLO 2 MP with DHCP Enabled

Use this procedure to access the iLO 2 MP using DHCP. This procedure assumes that you have a DHCP server connected to the same local network as your server blade, and the server blade is installed into the enclosure. The server blade comes from the factory with DHCP enabled.

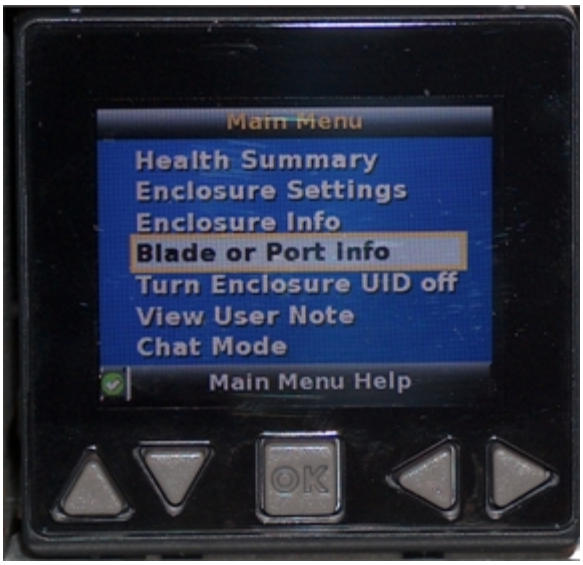
1. Use the display panel on the front of the enclosure to get the iLO 2 MP IP address.

   The iLO 2 MP IP address is assigned by the DHCP server to the server blade.

2. Use the down arrow on the front display panel to highlight Blade or Port Info.

   Figure 22 shows the Blade or Port Info selection highlighted on Main Menu of the front display panel.

Figure 22 Main Menu of the Front Display Panel



3. Press **OK**. The View Blade and Port Info screen displays on the front display panel.

   See Figure 23.

Figure 23 The View Blade and Port Info Screen

4. Using the left/right arrows, highlight Blade Info on the bottom of the front display panel.
5. Follow the on-screen directions to select the appropriate server blade, and press **OK**. The View Blade Info screen displays. See Figure 24.

Figure 24 The View Blade Info Screen

6. Write down the iLO 2 MP IP address that displays on the View Blade Info screen.
7. Access the iLO 2 MP through telnet, SSH, or through the web using the assigned DHCP IP address.
8. This ends the "Accessing the iLO 2 MP with DHCP Enabled" procedure.
9. Continue to "Configuring the iLO 2 MP" (page 44).

Accessing the iLO 2 MP with No Network Connection

You need to have a terminal emulator (for example, a laptop using hyperterm) to connect to the server blade.

To configure the RS-232 port to enable iLO 2 MP access:

Connecting the SUV Cable to the Server Blade

To connect your server blade to a terminal device using the SUV port:

- Insert the SUV cable into the SUV port.

  See Figure 25.

CAUTION: Disconnect the SUV cable from the port when not in use. The port and connector are not intended to provide a permanent connection.

On the SUV cable, locking buttons are located on the sides of the server blade connector. Always be sure to squeeze the locking buttons on the SUV cable connector before disconnecting the SUV cable from the I/O port. Failure to do so can result in damage to the port.

Use caution when walking near the server blade when the SUV cable is installed. Hitting or bumping the cable can cause the port on the server blade to break. This can damage the system board, which will then need to be replaced.

Figure 25 Connecting the SUV Cable to the Server Blade

Connecting a Terminal to the Server Blade

To establish a connection from your server to your terminal (or emulator device):

△ **CAUTION:** Disconnect the SUV cable from the port when not in use. The port and connector are not intended to provide a permanent connection.

1. Connect the standard DB9f to DB9f modem eliminator cable to the RS-232 port on the SUV cable. See Figure 26.

Figure 26 Serial Connector on the SUV Cable

2. Connect the other end of the DB9f to DB9f modem eliminator cable to your terminal device.
   For more information about iLO 2 MP functions, see the *HP Integrity iLO 2 Operations Guide*.
3. Verify that the parameters for RS-232 serial port communication are set to the following values on your terminal or emulator device:
   - VT 100 protocol
   - 8/none (parity)
   - 9600 baud
   - None (receive)
   - None (transmit)

4. To set the parameters, click **OK**.
5. If running an emulator, launch it now.
6. This ends the "Accessing the iLO 2 MP with No Network Connection" procedure.
7. Continue with "Configuring the iLO 2 MP" (page 44).

Configuring the iLO 2 MP

Use this procedure to configure iLO 2 MP settings after establishing a connection to iLO 2 MP using one of the two methods discussed in Section : "Accessing the Integrated Lights Out 2 Management Processor". This section includes important security considerations when configuring your server blade for remote access.

Accessing iLO 2 MP After Establishing a Connection to the Server Blade

Depending on how you connect to the server blade, choose one of the following ways to access the iLO 2 MP:

- Network connection (through OA iLO port)
  1. From a network-accessible computer, open a telnet session.
  2. Enter the iLO 2 MP address obtained in"Accessing the Integrated Lights Out 2 Management Processor" (page 40) in the appropriate screen.

     You now have access to the iLO 2 MP functionality through the telnet session.

- Serial port connection
- Ensure you have an MP prompt.
- Log in to the iLO 2 MP by using the following default values for the login ID and password (case sensitive):

  Login: **Admin**

  Password: **Admin**

You are now at the MP Main Menu screen.

```
                                Revision T.01.20

*******************************************************************************
                          MP ACCESS IS NOT SECURE
 Default MP users are currently configured and remote access is enabled.
 Modify default users' passwords or delete default users (see UC command)
                                    OR
             Disable all types of remote access (see SA command)
*******************************************************************************


  MP MAIN MENU:

        CO: Console
       VFP: Virtual Front Panel
        CM: Command Menu
     SMCLP: Server Management Command Line Protocol
        CL: Console Log
        SL: Show Event Logs
        HE: Main Help Menu
         X: Exit Connection

[mp0019bbc517e1] MP>
```

iLO 2 MP Security Requirements

Depending on how you set up your server blade, there are security concerns regarding whether you allow remote access to the server blade.

It is highly recommended that you allow remote access to the server blade. Remote access allows for remote system event log analysis, troubleshooting, and general system administration.

During the login process, a warning message displays. If you log in through a terminal (serial or telnet) an ASCII message scrolls by. If you log in through the web, a pop-up window displays, requiring a response. Click OK. The warning message is as follows:

⚠ **WARNING! MP ACCESS IS NOT SECURE**

Default MP users are currently configured and remote access is enabled.

Modify default users passwords or delete users (see the user Administration page)

or

Disable all types of remote access (see the Access Settings page)

Regardless of how you plan to access iLO 2 MP, HP highly recommends that you change the default MP password.

Depending on your required setup, continue with one of the following procedures:

- If you are allowing remote access, continue with "Securing Remote Access to the Server Blade" (page 45)
- If you are not allowing remote access, continue with "Remote Access Not Allowed" (page 48).

Securing Remote Access to the Server Blade

If you choose to configure iLO 2 MP for remote access (using DHCP or a static IP address), use the following steps to secure remote access to your server blade.

To secure remote access you need to change your MP password. To change your MP password:

1. From the MP Main Menu, enter **CM** to access the Command Menu.

   The Command Menu displays.
2. From the Command Menu, enter **UC** to access the User Configuration Menu.

   The User Configuration Menu displays.
3. From the User Configuration Menu, enter **C** to get to the Change Current User options.
4. Change **1-Admin** by entering **1**.

   A list of options available to change displays.
5. Change your password by entering **P**.

   Enter your new password in the dialog box.

   Your password must be between 8 and 24 characters.

   When you complete the password change procedure, the iLO 2 MP disconnects you from the server.
6. Re-establish your connection using the"Accessing iLO 2 MP After Establishing a Connection to the Server Blade" (page 44) procedure with your new MP password.
7. This ends the "Securing Remote Access to the Server Blade" procedure.

Setting the Server Blade to Power On Automatically

The server blade comes from the factory set to power on to standby power. To power on the server blade to full power when the server blade is inserted into the enclosure:

1. From the MP Main Menu, enter **pr** to access the Power Restore Configuration menu.

2. Enter **on** to set the power restore configuration to power on to full power as shown below:

```
[mp00110aa5301a] MP:CM> pr


PR


Power Restore Policy Configuration:
   Current -> ON  - Automatically Power On
              OFF - Remain Powered Off
              P   - Restore Previous Power State

Enter new value, or [Q] to Quit: on
```

3. Enter **y** to confirm changing the power restore configuration setting.
4. Power on the server through the iLO 2 MP by accessing the Power Control menu.
   Access the Power Control menu by entering **pc** from the MP Main Menu.
5. Enter **on** to power on the server blade as shown below:

```
[mp00110aa5301a] MP:CM> pc


PC


Current System Power State: On


Power Control Menu:
     C   - Power Cycle
     ON  - Power On
     OFF - Power Off
     G   - Graceful Shutdown

Enter menu item or [Q] to Quit: on
on
```

6. Enter **y** to confirm changing the power control setting.
   The server blade is now set up to power on to full power when it is inserted into the enclosure.

IMPORTANT: If this server blade was moved from another enclosure, run the RB command to enable the server blade to obtain the new enclosure name.

Configuring Remote Access to the Server Blade

At this point in the iLO 2 MP configuration process, you need to decide if the server blade will be accessed remotely or not. Remote access allows the server blade to be stopped, started, configured, and allows troubleshooting, from a remote location. If you disable remote access, all configuring and troubleshooting must be done through the SUV cable serial port. Depending on your set up, go to one of the following procedures:

- Remote access allowed. See "Remote Access Allowed" (page 47).
- Remote access not allowed. See "Remote Access Not Allowed" (page 48).

Remote Access Allowed

NOTE: If your server blade has a DHCP server connected to the OA/iLO port on the rear of the enclosure, this procedure is not required. Proceed to "Accessing EFI or the OS from iLO 2 MP" (page 48).

To allow remote access, you should have changed your iLO 2 MP password to secure your server blade. If you have a DHCP server connected to the OA/iLO port on the rear of the enclosure, your access is set. However, if you do not have access to a DHCP server, you can allow remote access using a static IP address (provided by your system administrator) that you enter into the iLO 2 MP menu.

△ **CAUTION:** If you have DHCP access through the OA/iLO port on the rear of the enclosure, **do not** perform this procedure. This procedure is for assigning a static IP address for remote access when a DHCP server is not connected to the enclosure.

If you do not have a DHCP server on your local network and you are assigning a static IP address to the server blade, you must disable DHCP on the server blade. Use the following steps to disable remote access to your server blade, and add your static IP address, subnet mask, and gateway address. Obtain these addresses from your system administrator.

To assign a static IP address to your server blade:

1. From the MP Main Menu, enter the **CM** command to get to the MP Command Menu screen.
2. Enter the **LC** command to get to the LAN Configuration Menu screen.

   The following displays:

```
At each prompt you may type DEFAULT to set default configuration or Q to Quit

Default LAN Configuration:

     - - MAC Address                :0x00110aa50058
     D - DHCP status                :Enabled
     I - IP Address                 :127.0.0.1
     M - MP Host Name               :mp00110aa50058
     S - Subnet Mask                :255.255.255.0
     G - Gateway Address            :127.0.0.1
     L - Link Status                :Auto Negotiate
     W - Web Console Port Number    :2023
     H - SSH Access Port Number     :22

Enter parameter(s) to change. A to modify All. Or (Q) to Quit:
```

3. From the LAN Configuration Menu, enter **d** to access the DHCP Status screen.
4. Follow the onscreen instructions to change the DHCP status from `Enabled` to `Disabled`.
5. Enter **y** to confirm the DHCP status change.
6. From the LAN Configuration Menu, enter **I** to access the IP Address screen.
7. Follow the onscreen instructions to add the static IP address you obtained from your system administrator.
8. From the LAN Configuration Menu, enter **s** to access the Subnet Mask screen.
9. Follow the onscreen instructions to add the subnet mask address you obtained from your system administrator.
10. From the LAN Configuration Menu, enter **g** to access the Gateway Address screen.
11. Follow the onscreen instructions to add the gateway address you obtained from your system administrator.
12. Confirm the changes were made by entering **LC**, and viewing the configuration screen.
13. The server blade is now set up for remote access with a static IP address.

Remote Access Not Allowed

If you do not want to allow remote access to the server blade, use the following steps to disable DHCP and other remote connections on your server blade.

CAUTION: Only use this procedure if you are disabling remote access to the server blade. Do not disable remote access if you have a DHCP server connected to the OA/iLO port on the rear of the enclosure. This procedure disables all remote access to the server blade and you lose your remote access the server blade.

1. From the MP Main Menu, enter the **CM** command to get to the MP Command Menu screen.
2. Enter the **LC** command to get to the LAN Configuration Menu screen.

   The following displays:

```
At each prompt you may type DEFAULT to set default configuration or Q to Quit

Default LAN Configuration:

     - - MAC Address                :0x00110aa50058
     D - DHCP status                :Enabled
     I - IP Address                 :127.0.0.1
     M - MP Host Name               :mp00110aa50058
     S - Subnet Mask                :255.255.255.0
     G - Gateway Address            :127.0.0.1
     L - Link Status                :Auto Negotiate
     W - Web Console Port Number    :2023
     - - SSH Access Port Number     :- (MP Feature Not Licensed)
     - - IPMI / LAN Port Number     :623

Enter parameter(s) to change. A to modify All. Or (Q) to Quit:
```

3. From the LAN Configuration Menu, enter `D` to get to the DHCP Status screen.
4. Follow the onscreen instructions to change the DHCP status from `Enabled` to `Disabled`.
5. From the LAN Configuration Menu, enter SA to get to the System Administration menu.
6. Disable Telnet, SSH, and web access by following the onscreen instructions.
7. Confirm the changes were made by entering `LC`, and viewing the configuration screen.

   Your connection will be lost because you disabled remote access to the server blade.

   If you have now disabled remote access. The only way access the server blade is through a direct connection. This is done using the serial RS-232 port on the SUV cable (with an emulator device). To directly connect to the server blade, see "Accessing the iLO 2 MP with No Network Connection" (page 42).

Accessing EFI or the OS from iLO 2 MP

The extensible firmware interface (EFI) is an Itanium-based architecture feature that provides an interface between the server blade OS and the server blade firmware. EFI provides a standard environment for booting an OS and running preboot applications.

Your security parameters were set regarding remote access.

To access EFI or the OS from the iLO 2 MP:

- From the MP Main Menu, enter **co** to access the Console Menu.

  Depending on how the server blade was configured from the factory, and if the OS is installed at the time of purchase, you should be in one of two places:

  - EFI Boot Manager menu
  - OS login prompt

  If the server blade has a factory-installed OS, you can interrupt the boot process to configure your specific EFI parameters.

  If you are at the EFI Shell prompt, go to "EFI Boot Manager" (page 49).

  If you are at the OS login prompt, go to "OS Login Prompt" (page 49).

EFI Boot Manager

If you are at the EFI Shell prompt, enter **exit** to get to the EFI Boot Manager menu.

Saving EFI Configuration Settings

There are other EFI settings you may want to configure at this time. For more EFI configuration options, see Appendix C (page 150).

After your EFI settings are configured, save your configuration settings using the NVRAM backup utility to save EFI and other server blade settings. See"NVRAM Backup Utility" (page 150).

Booting and Installing the Operating System

From the EFI Boot Manager prompt, there are two ways to proceed, depending on if the OS is loaded onto the server blade.

- If your OS is loaded onto your server blade, go to "Operating System is Loaded onto the Server Blade" (page 49).
- If the OS is not installed onto your server blade, see "Operating System is Not Loaded onto the Server Blade" (page 49).

Operating System is Loaded onto the Server Blade

If the OS is loaded on your server blade, Autoboot is the default setting. The server blade boots to the OS.

- Use your standard OS logon procedures, or see your OS documentation to log on to your OS.

Operating System is Not Loaded onto the Server Blade

There are two options on how to load the OS if it is not loaded onto your server blade.

- Load the OS from a CD. See "Installing the OS Using a USB DVD Drive and the OS Disks" (page 66).
- Load the OS using HP-UX Ignite. See "Loading the Operating System Using HP-UX Ignite" (page 49).

Loading the Operating System Using HP-UX Ignite

To install the OS using HP-UX Ignite, see: http://www.hp.com/go/sw-deployment-docs.

For EFI or HP-UX LAN configuration information, see "Server Blade to Enclosure Interface" (page 50).

OS Login Prompt

If your server blade is at the OS login prompt after you establish a connection to the server blade, use your standard OS log in procedures, or see your OS documentation for the next steps.

Server Blade to Enclosure Interface

This section describes the interface between the server blade and the server blade enclosure. This sections also shows the RJ-45 LAN interconnect ports on the rear of the server blade enclosure, and how they correspond with the Network Interface Controller (NIC) LEDs on the front of the server blade.

Port Locations on the Rear of the Server Blade Enclosure

LAN port mapping depends on the type of I/O card that is installed into the server blade. Figure 27 shows some of the modules available for the c-Class enclosure.

NOTE: This picture is used **only** to show the different modules, **not** where the modules should be installed.

Figure 27 Interconnect Modules on the Rear of the Server Blade Enclosure

Server Blade to Enclosure Interconnect Mapping

Table 8 (page 50) shows how the server blade slots interconnect with the slots on the c-Class enclosure.

Table 8 Server Blade to Enclosure Interconnect Mapping

Server Blade to c-Class Enclosure Mapping	
Server Blade NIC outputs or mezzanine slots	**Enclosure** Interconnect Slots
Ethernet NICs	Slots 1 and 2
Mezzanine Slot 1	Slots 3 and 4

Table 8 Server Blade to Enclosure Interconnect Mapping *(continued)*

Server Blade to c-Class Enclosure Mapping	
Mezzanine Slot 2	Slots 5 and 6
Mezzanine Slot 3	Slots 7 and 8

NOTE: Dual-width interconnect modules cannot be used in slots 1 or 2.

Only single- or dual-port mezzanine cards are supported.

LAN / NIC Configuration

Table 9 shows how the EFI and HP-UX LAN ports and front panel NIC numbers match up on the server blade enclosure.

Table 9 LAN / NIC Server Blade Enclosure Configuration

Front Panel NIC #	EFI LAN #	HP-UX LAN#
NIC 1	Core LAN port 1	LAN0
NIC 2	Core LAN port 2	LAN1
NIC 3	Core LAN port 3	LAN2
NIC 4	Core LAN port 4	LAN3

Configuring the HP 2 Internal Port SAS Host Bus Adapter

The following information is provided to assist you in configuring the 2 Internal Port SAS host Bus Adapter (HBA) controller during installation.

For more information regarding SAS HBAs, see http://www.hp.com/go/integrity-iocards-docs.

To flash firmware, use the `mptutil` command. To configure and maintain the IR functionality of the SAS controller on the HP Integrity server, use the `drvcfg` and `cfggen` EFI commands. If you are scripting multiple devices, use the `cfggen` command.

MPTUTIL Utility

The `mptutil` utility enables you to update the adapter flash memory with the EFI driver and HBA firmware. New versions of these images are released periodically.

IMPORTANT: Do not store the files in this package on a SAS device. If you store these files on a SAS device and the update fails, these files are accessible.

To update firmware:

1. Insert the *HP IPF Offline Diagnostics and Utilities CD* in the drive and boot to the EFI Shell.

   You can also download the firmware image file and update utility from the HP website at http://www.hp.com in the **Driver Downloads** section.

   IMPORTANT: When you boot the EFI enabled servers, the CD containing the utility must be in the drive to enable device mapping. The EFI utility and firmware image files are located in the root directory or in a subdirectory on the CD.

   The CD drive displays in the list of mapped devices as `fs0`.

2. To change to this device, enter **`fs0:`**

```
shell> fs0:
fs0:>
```

3. To determine the current version of the firmware:
   a. At the EFI Shell, enter `mptutil` from the directory that contains `mptutil.efi`.

      The following example indicates that the EFI Serial Attached SCSI card utility version is 1.01.12.00:

```
fs0:EFI\HP\TOOLS\NETWORK> mptutil
MPTUTIL-1.01.12.00
         Vendor  Device
Choice    ID      ID    Bus Device
 ------  ------  ------  --- ------
    0     1000h   0054h  14h  01h  LSI Logic SAS1068 Host Adapter
    1  -  Refresh
```

   b. Press **Enter**.
4. To update the firmware, use the `mptutil` command.
5. Reset the controller.

```
fs0:> reset
```

The `mptutil` commands and functions are listed in Table 10 and are described in the following sections.

Table 10 MPTUTIL Commands and Functions

Command	Function
`mptutil -f <firmware_file>`	Updating HBA RISC firmware on the controller
`mptutil -o -g <x86_file> <fcode_file>`	Updating EFI driver on first controller
`mptutil -o -vpd -c 0`	Viewing VPD information
Parameters in **< >** are optional. A space is required between command line options and their parameters.	

Flashing Firmware on First Controller

To update the HBA RISC firmware on the first controller:

1. At the `fs0:>` prompt, enter **`mptutil -f <firmware_file> -c 0`**.
2. At the `fs0:>` prompt, enter **`reset`**.

The filename is optional and you are prompted for a filename if it is omitted.

Another way to flash the firmware executes without your knowledge. When `mptutil` is issued, and a SAS HBA is in any state other than ready or operational, `mptutil` immediately performs a firmware download boot. The firmware provided by you to do the firmware download boot is immediately flashed after the firmware download boot has completed.

The `mptutil` command does this because the firmware only moves to the operational state if it is running from flash and not memory. Operational state is needed to do everything else provided in the utility.

Flashing BIOS and EFI Driver on the First Controller

To update the EFI driver on the first controller:

1. At the `fs0:>` prompt, enter **`mptutil -o -g <Bios_File> <EFI_driver_file> -c 0`**.
2. At the `fs0:>` prompt, enter **`reset`**.

The filename is optional and you are prompted for a filename if it is omitted.

Common Questions About Flashing Firmware

Question	After I update firmware on my SAS HBA, why doesn't the version string change in the menu?
Answer	The firmware you flashed on the HBA does not run until a diagnostic reset occurs. If you exit the utility and reenter it, the version string is updated.
Question	This image does not contain a valid `nvdata` image when I try to flash the firmware. Why?
Answer	You are expected to concatenate a proper `nvdata` image to the firmware. `MPTUTIL` prevents you from flashing an image without a concatenated `nvdata` image. To concatenate `nvdata` and firmware, run the `mptutil -o -d 64it__l.fw,sas106x.dat,output.fw` command. • `64it__l.fw` is the firmware image without an `nvdata` image. • `sas106x.dat` is the `nvdata` image. This file depends on the type/rev of HBA on which the firmware is used. • `output.fw` is the name of the file created with the firmware and `nvdata` image concatenated. Use this concatenated image for all boards of this type or revision.
Question	How do I program multiple cards in a server from the command line?
Answer	`MPTUTIL` (EFI) does not support this.
Question	Can I program a new flash and option ROM in the same command line argument?
Answer	Yes. Run the `mptutil -f <firmware_name> -b <option_rom_name>` command.

Viewing the VPD Information for EFI Driver and RISC Firmware

To view the VPD information for the EFI driver and RISC firmware, at the `fs0:>` prompt, enter **`mptutil -o -vpd -c 0`**.

EFI Commands

To configure an Integrated Mirror (IM) Array on the SAS Controller, use the following EFI commands:

- `DRVCFG` (GUI interface)
- `CFGGEN` (command line interface)

If you are not using the IM functionality, do not follow these procedures.

DRVCFG Utility

To configure an IM on the SAS controller:

Starting the DRVCFG Utility

To start the `drvcfg` configuration utility:

1. From the console menu, select the **EFI Shell** .
2. Enter **`drvcfg -s`** and press **Enter**.

Using the DRVCFG Utility

The configuration utility uses several input keys (**F1**, **F2**, **HOME**, **END**, and so on) that may not be supported by all terminal emulation programs. Each key has an alternate key that performs the same function. Review the terminal emulation program documentation to verify which input keys are supported. If problems occur using any of the function keys or **HOME**/**END**/**PGUP**/**PGDN,** use the alternate keys.

There are general key inputs throughout the configuration utility that apply on all screens:

F1 Help	Context sensitive help for the cursor-resident field.
Arrow Keys	Select up, down, left, or right to position the cursor.
Home/End	Select up, down, left, or right to position the cursor.
+/-	Use to change items with values in [ ] brackets. Numeric keypad + and numeric keypad - (minus) update a modifiable field to its next relative value.
Esc	Use to abort the current context operation or exit the current screen. User confirmation is solicited as required if changes were made by user. If you are using a serial console, pressing **Esc** causes a delay of several seconds before it takes effect. This is normal server behavior and is not an error.
Enter	Use to issue a command. Executable items are indicated by highlighted text and a different background color. Press **Enter** to issue the field's associated function.

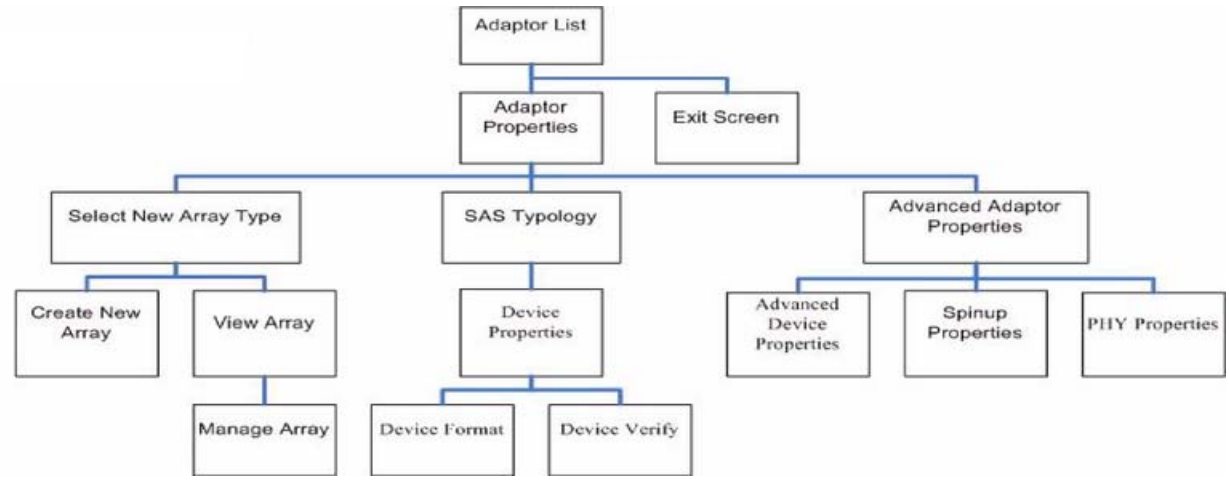
Configuration Utility Screens

All SAS BIOS configuration utility screens contain the following areas, starting at the top of the screen:

Header area	Identifies the utility and version number.
Menu area	Gives the title of the current screen and, on screens other than the Adapter List screen, identifies the adapter.
Main area	The main area for presenting data. This area has a cursor for item selection, and horizontal and vertical scroll bars if necessary.
Footer area	Provides general help information text.

Figure 28 (page 54) provides a map of how to access screens in the `drvcfg` utility.

Figure 28 Accessed Screens in the drvcfg Utility



DRVCFG Utility Screens

The following screens display as part of the `drvcfg` utility.

Adapter List Screen

The Adapter List screen displays when the configuration utility starts. This screen displays a scrolling list of up to 256 SAS controllers in the server, and provides information about each of them. Use the arrow keys to select a SAS controller, and press **`Enter`** to view and modify the selected SAS controller's properties.

You can view and modify the SAS controller whether it is enabled or disabled. You can use the Boot Support setting in the Adapter Properties menu to change the status of this setting. You must reconnect the EFI Driver for a new Boot Support setting to take effect.

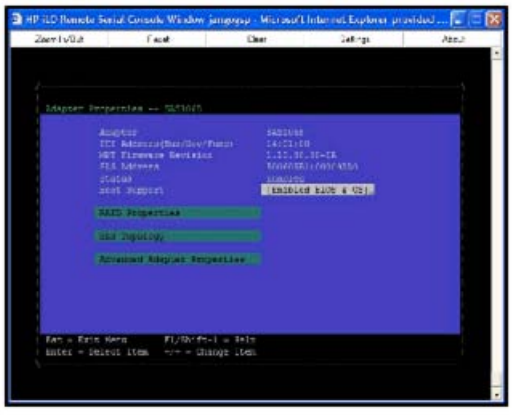
The following are descriptions for the Adapter List screen.

Adapter	Indicates the SAS Controller type
PCI Bus	Indicates the PCI Bus number assigned by the system BIOS to an adapter (`0x00 - 0xFF, 0 - 255` decimal)
PCI Dev	Indicates the PCI Device assigned by the system BIOS to an adapter (range `0x00 - 0x1F, 0 - 31` decimal)
PCI Fnc	Indicates the PCI Function assigned by the system BIOS to an adapter (range `0x00 - 0x7, 0 - 7` decimal)
FW Revision	Displays the Fusion MPT firmware version and type (IR or IT)
Status	Indicates whether the adapter is eligible for software control (Enabled, Disabled, or Error).
Enabled	Indicates the EFI Driver is controlling the adapter or will attempt to control the adapter upon reload.
Disabled	Indicates the EFI Driver is not controlling the adapter or will discontinue control of the adapter upon reload.
Error	Indicates the EFI Driver encountered a problem with the adapter. Viewing and modifying settings for the adapter is allowed but the information and functionality available may be limited.

Adapter Properties Screen

The Adapter Properties screen enables you to view and modify adapter settings. To scan the SAS controller's devices, select a SAS controller and press **Enter**. The Adapter Properties screen displays.

Figure 29 Adapter Properties Screen



Use the arrow keys to select **RAID Properties**, and press **Enter** to view the Select New Array Type screen.

To access the following screens, use the arrow keys to select the screen, and press **Enter** for the appropriate field:

- RAID Properties
- SAS Topology
- Advanced Adapter Properties

The following are descriptions for the Adapter Properties screen.

Adapter	Indicates the specific SAS Controller type.

PCI Address — Displays the PCI Address assigned by the system BIOS to the adapter.

- Bus value range `0x00 - 0xFF, 0 - 255` decimal
- Device value range `0x00 - 0x1F, 0 - 31` decimal
- Function range `0x00 - 0x7, 0 - 7` decimal

FW Revision — Displays the MPT firmware version and type. The format is `x.xx.xx.xx-yy` where:

`x.xx.xx.xx` refers to the FW version

`yy` refers to the type.

The currently supported type is IR.I).

SAS Address — Displays the SAS Address assigned to this adapter.

FW Revision — Displays the Fusion MPT firmware version and type (IR or IT)

Status — Indicates whether an adapter is eligible for configuration utility software control or is reserved for control by other software (Enabled, Disabled or Error).

Enabled	Indicates the EFI Driver is controlling the adapter or will attempt to control the adapter upon reload.
Disabled	Indicates the EFI Driver is not controlling the adapter or will discontinue control of the adapter upon reload.
Error	Indicates the EFI Driver encountered a problem with the adapter. Viewing and modifying settings for the adapter is allowed but the information and functionality available may be limited.

Boot Support — Specifies whether an adapter is eligible for configuration utility software control or is reserved for control by other software (Enabled BIOS & OS, Enabled BIOS Only, Enabled OS Only, or Disabled).

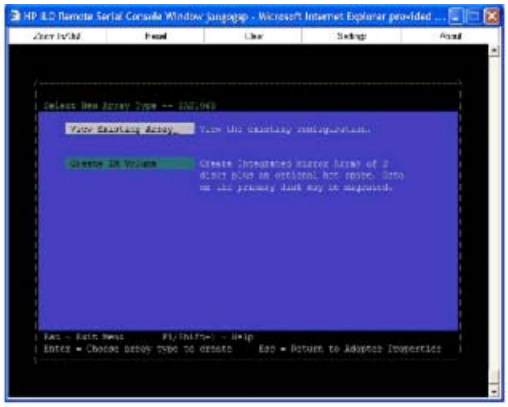
- Enabled BIOS & OS – SAS controller is controlled by the BIOS and OS driver.
- Enabled BIOS Only – SAS controller is controlled by the BIOS. This setting may not be supported by all OS drivers. For example, it is not possible to disable an adapter in a Windows driver.
- Enabled OS Only – SAS controller is controlled by the OS driver.
- Disabled – SAS controller is not controlled by the BIOS when the SAS controller is loaded. However, the adapter is visible through the configuration protocol.

Changes to the Boot Support setting are reflected in the Status field of the Adapter List menu. The new settings do not take effect until the BIOS is reloaded (system reboot).

RAID Properties Screens

There are four screens within RAID properties. To access the screens, select RAID Properties from the Adapter Properties screen. The Select New Array Type screen displays. See Figure 30 (page 57).

Figure 30 Select New Array Type Screen



Select New Array Type Screen

The Select New Array Type screen enables you to view an existing array or create an Integrated Mirror array of two disks, plus an optional hot spare.

- To go to the Create New Array screen, select Create IM Volume.
- To go to the View Array screen, select View an Existing Array.

Create New Array Screen

The Create New Array screen enables you to create an array. To access the Create New Array screen, press **Enter** on the Create IM Volume field from the Select New Array Type screen.

To create an array:

1. Select one of the following options:

   To migrate to an IM array, press **M**. This keeps the existing data, and the disk is synchronized.

   To delete all data on all disks in the array, press **D**. This overwrites data when creating a new IM array, and the disk is not synchronized.

2. To create the array after the volume is configured, press **C**. The server prompts you to save changes, which creates the array. During the creation process, the utility pauses. You are then taken back to the Adapter Properties screen.

The following are descriptions for the Create New Array screen.

Array Type	Indicates the type of array being created.
Array Size	Indicates the size of the array in Megabytes.
Bay	Displays the bay where the devices are located.
Device Identifier	Displays the device identifier.
RAID Disk	Specifies the devices (disks) that make up an IM array. If `RAID Disk` is `Yes`, the device is part of an IM array. If `RAID Disk` is `No`, the device is not part of an IM array. This field is grayed out under the following conditions: • The device does not meet the minimum requirements for use in an IM array. • The device is not large enough to mirror data on the primary drive. • This disk has been selected as the hot spare for the IM array.
Hot Spr	Specifies whether a device is the hot spare for an IM array. If `Hot Spr` is `Yes` the device is used as a hot spare for the IM array. If `Hot Spr` is `No`, the device is not used as a hot spare for the IM array. Only one hot spare per IM array is permitted. A hot spare is not required

in an IM. You can specify a hot spare at array creation, or after creation, if the array uses five disks or fewer. This field is grayed out under the following conditions:

- The device does not meet the minimum requirements for use in an IM array.
- The array has a hot spare.
- The array is made up of the maximum number of devices (six).
- The device isn't large enough to mirror existing data on the primary. The hot spare drive must be greater than or equal to the size of any drive in an IM volume.

Drive Status	OK	Disk is online and fully functional.
	Missing	Disk is not responding.
	Failed	Disk has failed.
	Initializing	Disk is initializing.
	CfgOffln	Disk is offline at host's request.
	User Fail	Disk is marked failed at host's request.
	Offline	Disk is offline for some other reason.
	Inactive	Disk has been set to inactive.
	Not Syncd	Data on disk is not synchronized with the rest of the array.
	Primary	Disk is the primary disk for a two disk mirror and is OK.
	Secondary	Disk is the secondary disk for a two disk mirror and is OK.
	Wrg Type	Device is not compatible for use as part of an IM array.
	Too Small	Disk is too small to mirror data.
	Max Dsks	Maximum number of disks allowed for this type of array has been reached, or maximum number of total IM disks on a controller has been reached.
	No SMART	Disk doesn't support SMART and cannot be used in an RAID array.
	Wrg Intfc	Device interface (SAS) differs from existing IM disks.
Pred Fail	Indicates whether device SMART is predicting device failure (Yes, No).	
Size(MB)	Indicates the size of the device in megabytes (megabyte = 1024 x 1024 = 1,048,576 bytes). If the device is part of a two-disk array, this field reflects the size of the array, not the size of the disk. If the device is part of a three or more disk array, this field is the size of the disk within the array. When creating a striped array, the usable size of the array is determined by the number of drives multiplied by the size of the smallest drive in the array. In arrays consisting of different sized drives, excess space on larger drives is unusable.	

View Array Screen

The View Array screen enables you to view the current array configuration. To access the View Array screen, press **Enter** on the View Existing Array field from the Select New Array Type screen.

You can perform the following actions on the View Array screen:

- To view the next array, press **N**.
- To create a new array, press **C**.

The following are descriptions for the View Array screen:

Array	Displays the number of this array.	
Identifier	Displays the array identifier.	
Type	Displays the RAID type.	
Scan Order	Displays the array scan order.	
Size (MB)	Displays the array size.	
Status	Displays the array status.	
Bay	Displays the device bay location.	
Device Identifier	Displays the device identifier.	
RAID Disk	Specifies the devices (disks) that make up an IM array. If `RAID Disk` is **Yes**, the device is part of an IM array. If `RAID Disk` is **No**, the device is not part of an IM array. This field is grayed out under the following conditions: • The device does not meet the minimum requirements for use in an IM array. • The device is not large enough to mirror existing data on the primary drive. • This disk has been selected as the hot spare for the IM array.	
Hot Spr	Specifies whether a device is the hot spare for an IM array. If `Hot Spr` is `Yes`, the device is used as a hot spare for the IM array. If `Hot Spr` is `No`, the device is not used as a hot spare for the IM array. Only one hot spare per IM array is permitted. A hot spare is not required in an IM. A hot spare can be specified at array creation, or after creation, if the array uses 5 disks or fewer. This field is grayed out under the following conditions: • The device does not meet the minimum requirements for use in an IM array. • The array has a hot spare. • The array is made up of the maximum number of devices (6). • The device isn't large enough to mirror data on the primary. The hot spare drive must be greater than or equal to the size of any drive in any IM volume.	
Drive Status	OK	Disk is online and fully functional.
	Missing	Disk is not responding.
	Failed	Disk has failed.
	Initializing	Disk is initializing.
	CfgOffln	Disk is offline at the host's request.
	User Fail	Disk is marked failed at host's request.

	Offline	Disk is offline for some other reason.
	Inactive	Disk has been set inactive.
	Not Syncd	Data on disk is not synchronized with the rest of the array.
	Primary	Disk is the primary disk for a two disk mirror and is OK.
	Secondary	Disk is the secondary disk for a two disk mirror and is OK.
	Wrg Type	Device is not compatible for use as part of an IM array.
	Too Small	Disk is too small to mirror data.
	Max Dsks	Maximum number of disks allowed for this type of array has been reached, or maximum number of total IM disks on a controller has been reached.
	No SMART	Disk doesn't support SMART and cannot be used in an RAID array.
	Wrg Intfc	Device interface (SAS) differs from existing IM disks.
Pred Fail		Indicates whether device SMART is predicting device failure (Yes, No).
Size(MB)		Indicates the size of the device in megabytes (megabyte = 1024 x 1024 = 1,048,576 bytes). If the device is part of a two-disk array, this field reflects the size of the array, not the size of the disk. If the device is part of a three or more disk array, this field is the size of the disk within the array. When creating a striped array, the usable size of the array is determined by the number of drives multiplied by the size of the smallest drive in the array. In arrays consisting of different sized drives, excess space on larger drives is unusable.

Manage Array Screen

The Manage Array screen enables you to manage the current array. To access the Manage Array screen, select the appropriate field and press **Enter** on the Manage Array field from the View Array screen.

The Manage Array screen enables you to perform the following actions:

Manage Hot Spare

To display a Hot Spare Management screen that has the same layout as the Create New Array screen, press **Enter** for Manage Hot Spare. This field is grayed out under the following conditions:

- The array is inactive.
- The array is at its maximum number of devices.
- Non-IR firmware is used.
- IR is disabled. The array is inactive.

Synchronize Array

To synchronize the IM array, press **Enter** on Synchronize Array. The screen prompts you to perform this action. Press **Y** for yes or **N** for no. This field is grayed out under the following conditions:

- The array is inactive.
- The array does not need to be resynchronized.
- The adapter's MPT firmware does not support the feature
- Non-IR firmware is used.
- IR is disabled. The array is inactive.

Activate Array

To activate an IM array, press **Enter** for Activate Array. You are prompted to perform this action. Press **Y** for yes or **N** for no.

Delete Array

To delete an IM array, press **Enter** for Delete Array. You are prompted to perform this action. Press **Y** for yes, and **N** for no.

The following are descriptions for the Delete Array screen

Identifier	Displays the identifier of this array.
Type	Displays the RAID type.
Scan Order	Displays the scan order of the array.
Size (MB)	Displays the size of this array.
Status	Displays the status of this array.

Exit the SAS Configuration Utility Screen

Because some changes only take effect when you exit the utility, exit the utility properly. To exit the utility:

1. To return to the Adapter List from Adapter Properties, press **ESC**.
2. To exit the utility from the Adapter List, press **ESC**.

A similar exit screen is used when exiting most other screens, and can be used to save settings.

The exit screen shows some options that are grey, indicating they are not available. You can only select available options. The exit choices are as follows:

- `Are you sure you want to exit?`
- `Cancel Exit`
- `Save changes and reboot`
- `Discard changes and reboot`
- `Exit the Configuration Utility and Reboot`

CFGGEN Utility

The `cfggen` utility is a command line utility that runs in the Linux, EFI, and Windows Pre-Installation (WinPE) environments. It is a minimally interactive program that you run from a command line prompt, or a shell script.

The results from invoking this utility are communicated through the program status value that is returned when the program exits.

Use the `cfggen` utility to create IM storage configurations on SAS controllers. Some `cfggen` commands work only with SAS adapters in the EFI environment.

Starting CFGGEN

The `cfggen` utility is located on the *HP IPF Offline Diagnostic and Utilities CD*. To use `cfggen`:

1. Insert the CD into the drive.
2. Boot the server to the EFI Shell prompt.
3. From the EFI Shell prompt, change to the CD drive:

   ```
   shell> fs0: Enter
   fs0:>
   ```

4. Change to the directory that contains `cfggen.efi`.

   ```
   fs0:> cd EFI\HP\TOOLS\NETWORK Enter
   fs0: EFI\HP\TOOLS\NETWORK>
   ```

5. From this directory, use `cfggen`.

CFGGEN Operation

The `cfggen` command is not case sensitive. You can enter `cfggen` commands and parameters in uppercase, lowercase, or a mixture of the two. Use the following conventions in command descriptions:

The `cfggen` command uses a command line interface.

Syntax: `cfggen <controller #> <command> <parameters>`

Use the following conventions in command descriptions:

- Text in italics must be entered exactly as shown on the command line.
- Text surrounded by **< >** must be replaced with a required parameter.
- Text surrounded by **[ ]** can be replaced by an optional parameter.
- Parameters surrounded by **{ }** must be entered one or more times, as appropriate for the issued command.
- Command line definition characters (**< >**, **[ ]**, and **{ }**) cannot be entered on the command line.

The program name, controller number, command, and parameters fields must be separated by the ASCII space character. The format of the parameters is command specific.

The program return value is returned to you when the program exits. A value of **0** is returned if the command is successful. Otherwise, a value of **1** is returned.

Rules for Creating IM Volumes and Hot Spare Disks

When creating IM volumes and hot spare disks, the following rules apply:

- All disks that are part of an IM volume or a hot spare for an IM volume must be on the same SAS controller.
- IM volumes are supported.
- Only two IM volumes (plus a global hot spare) per controller can be created.
- An IM array must have two disks.
- A hot spare disk cannot be created without at least one IM volume already created.
- The utility does not allow adding a hot spare disk type different from disk types in the volume.
- With the `AUTO` command all drives used are the same type as the first available disk found, and the size is limited to the size of the smallest disk.

CFGGEN Utility Commands

The following are the commands available for the `cfggen` utility.

CREATE Command

The CREATE command creates IM volumes on the SAS controller. Firmware and hardware limitations for this family of cards limit the number of configurations that are possible.

Syntax

```
cfggen <controller #> create <volume type> <size> [qsync] [noprompt]
```

Parameters

<volume type>	Volume type for the volume to be created. Valid value is IM.
<size>	Size of the IM volume in megabytes, or "MAX" for the maximum size available.
[*qsync*]	Quick synchronization of the volume created.
[*noprompt*]	Eliminates warnings and prompts.

Operation

After a disk is added to an IM volume, its storage capacity might or might not be used depending on drive capacity and volume capacity. For example, if you add a 36 GB disk to a volume that only uses 9 GB of capacity on each disk, the remaining 27 GB of capacity on the disk is unusable.

The disk identified by the first SCSI ID on the command line is assigned as the primary disk when creating an IM volume. If the SAS controller is allowed to resynchronize the disks, the data on the primary disk is available by accessing the newly created volume.

AUTO Command

The AUTO command automatically creates an IM volume on the SAS controllers. The volume is created with the maximum number of disks available for use in the specified volume type. The main difference between the AUTO command and the CREATE command is that with AUTO command, you do not specify SCSI ID values for disks to use in the volume. The cfggen utility uses the first disks it finds that are usable in the IM volume. Firmware and hardware limitations for the family of controllers limit the number of configurations that are possible.

Syntax

```
cfggen <controller #> auto <volume type> <size> [qsync] [noprompt]
```

Parameters

<volume type>	Volume type for the volume to be created. Valid value is IM.
<size>	Size of the RAID volume in megabytes, or "MAX" for the maximum size available.
[qsync]	Quick synchronization of the volume created.
[noprompt]	Eliminates warnings and prompts.

Operation

When **AUTO** creates an IM volume, the first disk found is assigned as the primary disk. If the controller is allowed to resynchronize the disks, the data on the primary disk is available by accessing the newly created volume. Reply **Yes** if you want to complete the creation.

HOTSPARE Command

The HOTSPARE command creates a hot spare disk. The hot spare disk is added to hot spare pool 0.

Syntax

```
cfggen <controller #> HOTSPARE [DELETE] <Encl:Bay>
```

Parameters

<controller #>	A SAS controller number between 0 and 255.
[DELETE]	Specifies that the hot spare is to be deleted (omit the DELETE keyword to specify hot-spare creation).
<Encl>:<Bay>	Enclosure number and Bay number that identify the disk drive that becomes the hot spare.

Operation

The number of disks in an IM array plus the hot spare cannot exceed three. You can create only one hot spare disk. Make sure the capacity of the hot spare disk is greater than or equal to the capacity of the smallest disk in the logical drive. An easy way to verify this is to use the `DISPLAY` command.

See"Rules for Creating IM Volumes and Hot Spare Disks" (page 62).

Verify and Install the Latest Firmware

HP attempts to provide you with the most current version of firmware. However, there might be instances when this is not the case.

To ensure that you have the latest version of firmware running on your server, verify the firmware installed on your server blade. If your firmware isn't the latest, download the latest firmware from the web and create a CD to install the firmware on the server. To install the firmware onto your server blade, you must have an external USB DVD drive attached to the server blade. To install an external DVD drive to your server blade, see"Operating System is Not Loaded onto the Server Blade" (page 49).

Verify the Latest Version of Firmware

To verify your firmware version:

1. Log in to the iLO 2 MP (serially or through a telnet session).
2. Enter **co** to get to the EFI Boot Manager Menu.

   The current server blade firmware displays under System Overview on the EFI Boot Manager Menu.
3. Go to http://www.hp.com/go/bizsupport.
4. Choose download drivers and software.
5. Choose Itanium-based servers from the Server category.
6. Choose your product from the servers listed.
7. Choose the OS.
8. Choose the firmware category you want to verify.
9. Compare the version of firmware available on the website to the version of firmware on the server blade.
   - If the firmware versions are the same, you don't need to update your firmware.
   - If the firmware versions are different, you need to update your firmware. Proceed to "Download the Latest Version of Firmware" (page 64).

Download the Latest Version of Firmware

To download the latest version of firmware from the web:

1. Go to http://www.hp.com/go/bizsupport.
2. Choose download drivers and software.
3. Choose Itanium-based servers from the Server category.
4. Choose your product from the servers listed.

5. Choose the OS.
6. Choose the firmware category you want to download.
7. Download the firmware to a CD.

Install the Latest Version of Firmware on the Server

To install the firmware on the server:

1. Connect to the server console. See "Accessing the Integrated Lights Out 2 Management Processor" (page 40).
2. Make sure the external USB DVD drive is connected and turned on. See "Installing the OS Using a USB DVD Drive and the OS Disks" (page 66).
3. Insert the CD with the copy of the latest version of firmware into the external DVD drive.
4. Use the EFI Boot Manager Menu and boot to the drive that contains the CD with the updated firmware.
5. Follow the instructions to update the firmware.

4 Booting and Shutting Down the Operating System

This chapter covers procedures for booting and shutting down operating systems that run on the server blade. The operating systems that run on the server blade are HP-UX 11i Version 2 (B.11.23), HP-UX 11i Version 3 (B.11.31), HP OpenVMS v8.3, Microsoft Windows Enterprise Server 2003, Red Hat Enterprise Linux 4 update 4, and Novell SuSE Linux Enterprise Server 10.

Operating Systems Supported on the Server Blade

HP supports the following operating systems on the server blade.

- HP-UX 11i Version 2 (B.11.23)
- HP-UX 11i Version 3 (B.11.31),
- HP OpenVMS v8.3
- Microsoft Windows Server 2003
- Red Hat Enterprise Linux 4 update 4
- Novell SuSE Linux Enterprise Server 10

Installing the Operating System onto the Server Blade

These are generalized operating system installation procedures. For more specific details regarding OS installation, see your operating system documentation.

Installing the OS Using a USB DVD Drive and the OS Disks

Before you can install the OS from a DVD disk, you must connect an external USB DVD device. To install the OS onto the server blade from a USB DVD:

1. Connect the Integrity SUV cable to the front of the server blade.

   See Figure 31.

   Figure 31 Connecting a USB DVD Drive to the Server Blade

2. Connect the USB DVD cable to one of the USB ports on the SUV cable.

   For the ports on the SUV cable, see Figure 32.

Figure 32 Ports on the SUV Cable

1. Serial port
2. USB ports (2)
3. Video port

3. Reset (or reconnect) the server blade, and reboot to EFI.
4. Turn on the external USB DVD device.

Installing the OS from the External USB DVD Device

To install the OS from an external USB DVD device:

1. Insert the CD with the OS into the external USB DVD drive.
2. Use the EFI Boot Manager Menu and boot to the drive that contains the CD with the OS.
3. From the boot menu, select `EFI Shell (Built In)`.
4. At the EFI Shell prompt, specify the device name (for example, `fs1:`) for the DVD and enter the EFI install command, as in the following example.

   If the device is not automatically selected, select the device name for the DVD and run install.

   For example, from the EFI Shell prompt you see something similar to this:

   ```
   Shell> fs1:
   fs1:\> install
   ```

   If you do not see the USB DVD drive, use the EFI `Map` command to list all the device names from the EFI Shell prompt. The list of devices displays automatically, and the install process selects the device for you. The `Map` command displays the following (this may not match completely:

```
Seg  Bus  Dev  Fnc  Vendor  Device Slot
#    #    #    #     ID      ID     #   Path
---  ---  ---  ---  ------  ------  ---  -----------
00   00   02   01  0x103C  0x1048   XX  Acpi(HWP0002,0)/Pci(2|1)# MP  - rope 0
00   00   01   00  0x1033  0x0035   XX  Acpi(HWP0002,0)/Pci(1|0)# USB - rope 0
00   00   01   01  0x1033  0x0035   XX  Acpi(HWP0002,0)/Pci(1|1)# USB - rope 0
00   00   01   02  0x1033  0x00E0   XX  Acpi(HWP0002,0)/Pci(1|2)# USB - rope 0
00   00   02   00  0x103C  0x1290   XX  Acpi(HWP0002,0)/Pci(2|0)# MP  - rope 0
00   20   01   00  0x1000  0x0030   XX  Acpi(HWP0002,100)/Pci(1| # SCSI- rope 1
00   40   01   00  0x1077  0x2312   XX  Acpi(HWP0002,200)/Pci(1|0) # FC  - rope 2
00   40   01   01  0x1077  0x2312   XX  Acpi(HWP0002,200)/Pci(1|1) # FC  - rope 2
00   80   01   00  0x14E4  0x1648   XX  Acpi(HWP0002,400)/Pci(1|0) # LAN - rope 4
00   80   01   01  0x14E4  0x1648   XX  Acpi(HWP0002,400)/Pci(1|1) # LAN - rope 4
00   80   03   00  0x14E4  0x1648   XX  Acpi(HWP0002,400)/Pci(3|0) # LAN - rope 4
00   80   03   01  0x14E4  0x1648   XX  Acpi(HWP0002,400)/Pci(3|1) # LAN - rope 4
```

   The USB DVD device is the one shown in bold.

5. The OS now starts loading onto the server blade. Follow the onscreen instructions to fully install the OS.
6. Continue with "Configuring System Boot Options" (page 68)

Installing the OS Using HP Ignite–UX

The Ignite-UX product is an HP-UX administration tool that helps you install the HP-UX OS on multiple server blades on your network. Ignite-UX also enables you to:

- Create custom install configurations, (for use in multiple installations on server blades)
- Recover HP-UX server blades remotely
- Create custom recovery media including tape, CD and DVD
- Manage and monitor multiple server blade installation sessions

To install the OS onto the server blade using HP-UX Ignite, see the following HP documentation: http://www.hp.com/go/sw-deployment-docs.

Installing the OS Using vMedia

Virtual media (vMedia) provides you with virtual devices that mimic physical hardware devices, such as a virtual DVD drive that connects through the network to the server blade (as if they were physically connected). The vMedia device can be a physical DVD drive on the server blade, or it can be an image file stored on a local disk drive or network drive.

Booting from the iLO 2 MP DVD enables you to deploy an OS from a network drive to multiple server blades, and perform disaster recovery of the failed OS. The iLO 2 MP device uses a client-server model to perform the vMedia functions. The iLO 2 MP device streams the vMedia data across a live network connection between the server blade and the host server. The vMedia Java™ applet provides data to the iLO 2 MP as it requests it.

For more information regarding loading the OS with vMedia, see the *HP Integrity iLO 2 Operations Guide*.

NOTE: Once the OS is loaded, make sure to save your nonvolatile memory settings to preserve boot entries in case of blade failure.

Configuring System Boot Options

This section discusses the configurable system boot options on the server blade, including the boot options list and the autoboot setting for the server.

- **Boot Options List**

  The boot options list is a list of loadable items available for you to choose from the EFI Boot Manager Menu. Ordinarily the boot options list includes the EFI Shell and one or more operating system loaders.

  The following example includes boot options for HP-UX, Linux, and the EFI Shell.

```
                    EFI Boot Manager ver 2.00 [14.62]
OS might use only the primary console set via boot manager or conconfig command
                                          /-----------------------------------\
  /-----------------------------------\   |       System Overview             |
  |            Boot Menu              |   |   hp server BL860c                |
  | HP-UX Primary Boot: 0/2/1/0....   |   | Serial #:  USE7234MV8             |
  | Internal Bootable DVD             |   |                                   |
  | EFI Shell [Built-in]              |   | System Firmware:  3.01 [4739]     |
  | iLO Virtual Media                 |   | BMC Version:      5.20            |
  | Core LAN Port 1                   |   | MP Version:       T.02.17         |
  | SuSE on fs0:                      |   | Installed Memory: 6144 MB         |
  | HP-UX 11.31 from SAS disk         |   |                                   |
  | ----------------------------      |   |  CPU  Logical                     |
  | Boot Configuration                |   | Module CPUs   Speed  Status       |
  | System Configuration              |   |    0    2    1.4 GHz Active       |
```

```
  | Security Configuration           |  |    1    2    1.4 GHz Active      |
  |                                  |  |                                   |
  \----------------------------------/  |                                   |
                                        |                                   |
                                        |                                   |
                                        \-----------------------------------/

Use ^ and v to change option(s). Use Enter to select an option
```

◦ To correctly view the operating system console messages, go to the EFI Boot Manager Menu under the EFI Boot Manager Menu.

From the Boot Configuration Menu, select Console Configuration.

The Console Configuration screen displays the current configuration of the system console.

```
                    EFI Boot Manager ver 2.00 [14.62]
OS might use only the primary console set via boot manager or conconfig command
                                      /----------------------------------\
  /----------------------------------\  |       System Overview            |
  |       /-------------------------------------------------------------\    |
  | HP-UX |                  Console Configuration                      |    |
  | In/---| P  Serial Acpi(HWP0002,PNP0A03,0)/Pci(1|2) Vt100+ 9600      |    |
  | EF|^  | NC VGA    Acpi(HWP0002,PNP0A03,0)/Pci(4|0)                  |    |
  | iL| Ad|                                                            |    |
  | Co| Ed\------------------------------------------------------------/    |
  | Su| Remo                                                               |
  | HP| Edit O/-------------------------------------------------\          |
  | --| AutoBo|      Console Help             Console Status      |        |
  | Bo| BootNe| <ENTER> to enable/disable    P  - Primary         |us      |
  | Sy| ------| P/p to select primary        S  - Secondary       |ve      |
  | Se| Driver| T/t to select terminal type  NC - Not Configured  |ve      |
  |   | Consol| B/b to select baud rate                           |        |
  \---| ------|                                                   |        |
      | System\---------------------------------------------------/        |
      |                          |       |                                 |
      \--------------------------/       \---------------------------------/

Use <^|v> to scroll    <ENTER> to Select       <ESC> or <X/x> for Previous Menu
```

Select the appropriate console configuration for your environment.

NOTE: When exiting the Console Configuration screen, be sure to save your changes and perform a server reset to activate your configuration changes.

IMPORTANT: When selecting a console as Primary, all other consoles **must** be set to NC to allow the OS console messages to display to the proper device. This applies to all operating systems.

◦ To manage the boot options list for each server, use the EFI Shell, the EFI Boot Option Maintenance Menu, or operating system utilities.

At the EFI Shell, use the `bcfg` command to support list and manage the boot options list for HP-UX.

The EFI Boot Option Maintenance Menu provides the Add a Boot Option, Delete Boot Option(s), and Change Boot Order menu items (use this method if you must add an EFI Shell entry to the boot options list).

Operating system utilities for managing the boot options list include the HP-UX `setboot` command.

See"Adding HP-UX to the Boot Options List" (page 70).

- **Autoboot Setting**

The **`autoboot`** setting determines, at startup, whether a server automatically loads the first item in the boot options list, or remains at the EFI Boot Manager Menu. With autoboot enabled, EFI loads the first item in the boot options list after a designated timeout period.

Configure the autoboot setting for an HP Integrity server using either the `autoboot` EFI Shell command, or the Set Auto Boot Time Out menu item from the EFI Boot Configuration menu.

Examples of autoboot commands for HP-UX:

- Disable autoboot from the EFI Shell by issuing `autoboot off`
- Enable autoboot with the default timeout value by issuing `autoboot on`
- Enable autoboot with a timeout of 60 seconds by issuing the `autoboot time 60`
- Set autoboot from HP-UX using `setboot`
- Enable autoboot from HP-UX using `setboot -b on`
- Disable autoboot using `setboot -b off`

Examples of autoboot commands for Linux:

- Disable autoboot from the EFI Shell by issuing `autoboot off`
- Enable autoboot with the default timeout value by issuing `autoboot on`
- Enable autoboot with a timeout of 60 seconds by issuing the `autoboot 60`
- Disable the automatic retries during autoboot by issuing `autoboot -nr 0`

For more information on the `autoboot` command, enter `help autoboot`.

Booting and Shutting Down HP-UX

This section covers booting and shutting down HP-UX on the server blade.

- To add an HP-UX entry to the boot options list, see "Adding HP-UX to the Boot Options List" (page 70).
- To boot HP-UX, use one of the following procedures:
  - To boot HP-UX normally, see "HP-UX Standard Boot" (page 71).

    HP-UX boots in multi-user mode.
  - To boot HP-UX in single-user more, see "Booting HP-UX in Single-User Mode (EFI Shell)" (page 73).
  - To boot HP-UX in LVM-maintenance mode, see "Booting HP-UX in LVM-Maintenance Mode" (page 74).
- To shut down the HP-UX operating system, see "Shutting Down HP-UX" (page 74).

Adding HP-UX to the Boot Options List

This section describes how to add an HP-UX entry to the system boot options list.

You can add the `\EFI\HPUX\HPUX.EFI` loader to the boot options list from the EFI Shell or EFI Boot Configuration menu (or in some versions of EFI, the Boot Options Maintenance Menu).

NOTE: On HP Integrity servers, the operating system installer automatically adds an entry to the boot options list.

Adding the HP-UX Boot Option

This procedure adds an HP-UX item to the boot options list from the EFI Shell.

NOTE: To add an HP-UX boot option when logged in to HP-UX, use the `setboot` command. For details, see the *setboot*(1M) manpage.

1. Access the EFI Shell environment.
   a. Log in to iLO 2 for Integrity and enter **CO** to access the system console.

      When accessing the console, confirm that you are at the EFI Boot Manager Menu (the main EFI menu).

      If you are at another EFI menu, choose the **Exit** option from the submenus until you return to the screen with the EFI Boot Manager heading.

   b. Choose the EFI Shell menu option from the EFI Boot Manager Menu to access the EFI Shell environment.
2. Access the EFI System Partition (`fs`*`X`*`:` where *X* is the file system number) for the device from which you want to boot HP-UX.

   For example, enter **`fs2:`** to access the EFI System Partition for the bootable file system number **2**. The EFI Shell prompt changes to reflect the file system currently accessed.

   The full path for the HP-UX loader is **`\EFI\HPUX\HPUX.EFI`** and it should be on the device you are accessing.
3. At the EFI Shell environment, use the `bcfg` command to manage the boot options list.

   The `bcfg` command includes the following options for managing the boot options list:

   - `bcfg boot dump` – Display all items in the boot options list for the server.
   - `bcfg boot rm #` – Remove the item number specified by *#* from the boot options list.
   - `bcfg boot mv #a #b` – Move the item number specified by *#a* to the position specified by *#b* in the boot options list.
   - `bcfg boot add # file.efi "Description"` – Add a new boot option to the position in the boot options list specified by *#*. The new boot option references *file.efi* is listed with the title specified by *Description*.

     For example, `bcfg boot add 1 \EFI\HPUX\HPUX.EFI "HP-UX 11i"` adds an HP-UX 11i item as the first entry in the boot options list.

   For details, see the `help bcfg` command.
4. Exit the console and iLO 2 MP interfaces if you are finished using them.

   Press **Ctrl-B** to exit the system console and return to the iLO 2 MP Main Menu. To exit the MP, enter **X** at the Main Menu.

HP-UX Standard Boot

To boot HP-UX, use either of the following procedures:

- "Booting HP-UX (EFI Boot Manager)"; or
- "Booting HP-UX (EFI Shell)"

Booting HP-UX (EFI Boot Manager)

From the EFI Boot Manager Menu, choose an item from the boot options list to boot HP-UX.

1. Access the EFI Boot Manager Menu for the server on which you want to boot HP-UX.

   Log in to iLO 2 MP and enter **CO** to choose the system console.

   Confirm that you are at the EFI Boot Manager Menu (the main EFI menu) when accessing the console. If you are at another EFI menu, choose the **Exit** option from the submenus until you return to the screen with the EFI Boot Manager heading.
2. At the EFI Boot Manager Menu, choose an item from the boot options list.

   Each item in the boot options list references a specific boot device and provides a specific set of boot options or arguments you use when booting the device.

3. Press **Enter** to initiate booting using the chosen boot option.
4. Exit the console and iLO 2 MP interfaces when finished using them.

   Press **Ctrl-B** to exit the system console and return to the MP Main Menu. To exit the MP Main Menu, enter **X** at the MP Main Menu.

Booting HP-UX (EFI Shell)

From the EFI Shell environment, boot HP-UX on a device by first accessing the EFI System Partition (for example `fs0:`) for the root device, then entering **HPUX** to initiate the loader.

1. Access the EFI Shell environment for the server on which you want to boot HP-UX.

   Log in to the iLO 2MP and enter **CO** to choose the system console.

   Confirm that you are at the EFI Boot Manager Menu (the main EFI menu) when accessing the console. If you are at another EFI menu, choose the **Exit** option from the submenus until you return to the screen with the EFI Boot Manager heading.

   From the EFI Boot Manager Menu, choose the EFI Shell menu option to access the EFI Shell environment.

   The EFI Shell displays all the files systems and block devices available.
2. At the EFI Shell environment, issue the `map` command to list all currently mapped bootable devices.

   The bootable file systems of interest typically are listed as `fs0:`, `fs1:`, and so on.
3. Access the EFI System Partition (`fs`*X*`:` where *X* is the file system number) for the device from which you want to boot HP-UX.

   For example, enter **`fs2:`** to access the EFI System Partition for the bootable file system number **2**. The EFI Shell prompt changes to reflect the file system currently accessed.

   NOTE: The file system number might change each time it is mapped (for example, when the server boots, or when you issue the `map -r` command).
4. When accessing the EFI System Partition for the desired boot device, issue the HPUX command to initiate the `HPUX.EFI` loader on the device you are accessing.

   The full path for the loader is **`\EFI\HPUX\HPUX.EFI`**. When initiated, the loader references the `\EFI\HPUX\AUTO` file and proceeds to boot HP-UX using the default boot behavior specified in the `AUTO` file.

   You have 10 seconds to interrupt the automatic booting of the default boot behavior. Pressing any key during this 10-second period stops the HP-UX boot process and enables you to interact with the `HPUX.EFI` loader. To exit the loader (the `HPUX>` prompt) enter **`exit`** (this returns you to the EFI Shell).

   To boot the HP-UX operating system, do not enter anything during the 10 second period given for stopping at the `HPUX.EFI` loader.

```
Shell> map
Device mapping table
  fs0  : Acpi(000222F0,269)/Pci(0|0)/(Pun8,Lun0)/HD(Part1,Sig72550000)
  blk0 : Acpi(000222F0,269)/Pci(0|0)/(Pun8,Lun0)
  blk1 : Acpi(000222F0,269)/Pci(0|0)/(Pun8,Lun0)/HD(Part1,Sig72550000)
  blk2 : Acpi(000222F0,269)/Pci(0|0)/(Pun8,Lun0)/HD(Part2,Sig72550000)
  blk3 : Acpi(000222F0,2A8)/Pci(0|0)/(Pun8,Lun0)
  blk4 : Acpi(000222F0,2A8)/Pci(0|1)/(Pun2,Lun0)

Shell> fs0:

fs0:\> hpux

(c) Copyright 1990-2002, Hewlett Packard Company.
```

```
All rights reserved

HP-UX Boot Loader for IA64  Revision 1.723

Press Any Key to interrupt Autoboot
\efi\hpux\AUTO ==> boot vmunix
Seconds left till autoboot -   9
```

5. Exit the console and iLO 2 MP interfaces when finished using them.

   Press **Ctrl-B** to exit the system console and return to the MP Main Menu. To exit the MP Main Menu, enter **X** at the MP Main Menu.

Booting HP-UX in Single-User Mode (EFI Shell)

To boot HP-UX in single-user mode from the EFI Shell:

1. Stop the boot process at the `HPUX.EFI` interface (the HP-UX Boot Loader prompt, `HPUX>`)
2. Enter the `boot -is vmunix` command.
3. Access the EFI Shell environment for the server on which you want to boot HP-UX in single-user mode.

   Log in to the iLO 2 MP and enter **`CO`** to choose the system console.

   Confirm that you are at the EFI Boot Manager Menu (the main EFI menu) when accessing the console. If you are at another EFI menu, choose the Exit option from the submenus until you return to the screen with the EFI Boot Manager heading.

   From the EFI Boot Manager Menu, choose the **EFI Shell** menu option to access the EFI Shell environment.

4. Access the EFI System Partition by entering `fs`*X*.

   where *X* is the file system number for the device used to boot HP-UX.

5. When accessing the EFI System Partition for the desired boot device, issue the `HPUX`command to initiate the `\EFI\HPUX\HPUX.EFI` loader on the device you are accessing.
6. Boot to the HP-UX Boot Loader prompt (`HPUX>`) by pressing any key within the 10 seconds given for interrupting the HP-UX boot process. Use the `HPUX.EFI` loader to boot HP-UX in single-user mode in the next step.

   After you press a key, the `HPUX.EFI` interface (the HP-UX Boot Loader prompt, `HPUX>`) launches. For help using the `HPUX.EFI` loader, enter the `help` command. To return to the EFI Shell, enter **`exit`**.

```
fs0:\> hpux

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HP-UX Boot Loader for IA64  Revision 1.723

Press Any Key to interrupt Autoboot
\efi\hpux\AUTO ==> boot vmunix
Seconds left till autoboot -   9
```

[User Types A Key to Stop the HP-UX Boot Process and Access the HPUX.EFI Loader]

```
   Type 'help' for help

HPUX>
```

7. At the `HPUX.EFI` interface (the HP-UX Boot Loader prompt, `HPUX>`) enter the `boot -is vmunix` command to boot HP-UX (the `/stand/vmunix` kernel) in single-user (**`-is`**) mode.

```
HPUX> boot -is vmunix
> System Memory = 4063 MB
loading section 0
.................................................. (complete)
loading section 1
```

```
........ (complete)
loading symbol table
loading System Directory(boot.sys) to MFS
....
loading MFSFILES Directory(bootfs) to MFS
......
Launching /stand/vmunix
SIZE: Text:25953K + Data:3715K + BSS:3637K = Total:33306K

Console is on a Serial Device
Booting kernel...
```

8. Exit the console and iLO 2 MP interfaces when finished using them.

   Press **Ctrl-B** to exit the system console and return to the MP Main Menu. To exit the MP, enter **X** at the MP Main Menu.

Booting HP-UX in LVM-Maintenance Mode

To boot HP-UX in LVM-maintenance mode from the EFI Shell:

1. Stop the boot process at the `HPUX.EFI` interface (the HP-UX Boot Loader prompt, `HPUX>`).
2. Enter the `boot -lm vmunix` command.
3. Access the EFI Shell environment for the server on which you want to boot HP-UX in LVM-maintenance mode.

   Log in to the iLO 2 MP and enter **`CO`** to choose the system console.

   Confirm that you are at the EFI Boot Manager Menu (the main EFI menu) when accessing the console. If you are at another EFI menu, choose the **Exit** option from the submenus until you return to the screen with the EFI Boot Manager heading.

   From the EFI Boot Manager Menu, choose the **EFI Shell** menu option to access the EFI Shell environment.
4. Access the EFI System Partition (`fs`*X*`:` where *X* is the file system number) for the device from which you want to boot HP-UX.
5. When accessing the EFI System Partition for the desired boot device, issue the `HPUX` command to initiate the `\EFI\HPUX\HPUX.EFI` loader on the device you are accessing.
6. Press any key within the 10 seconds given for interrupting the HP-UX boot process. This stops the boot process at the `HPUX.EFI` interface (the HP-UX Boot Loader prompt, `HPUX>`).
7. At the `HPUX.EFI` interface, enter the `boot -lm vmunix` command to boot HP-UX (the `/stand/vmunix` kernel) in LVM-maintenance (`-lm`) mode.
8. Exit the console and iLO 2 MP interfaces when finished using them.

   Press **Ctrl-B** to exit the system console and return to the MP Main Menu. To exit the MP, enter **X** at the MP Main Menu.

Shutting Down HP-UX

To shut down HP-UX running on a server, use the `shutdown` command. You have the following options when shutting down HP-UX:

- Shut down and reboot an HP-UX server using **`shutdown -r`**
- Shut down and halt (power off) an HP-UX server using **`shutdown -h`**

For more information, see the *shutdown*(1M)manpage.

1. Log in to HP-UX running on the server that you want to shut down.

   Log in to iLO 2 MP for the server and use the Console menu to access the system console. Accessing the console through iLO 2 MP enables you to maintain console access to the server after HP-UX has shut down.

2. Issue the `shutdown` command with the appropriate command-line options.

   The command-line options you specify dictate the way in which HP-UX shuts down, and whether the server is rebooted.

   Use the following list to choose an HP-UX shutdown option for your server:

   - Shut down HP-UX and halt (power off) the server using `shutdown -h`

     Reboot a halted server by powering on the server using the `PC` command at the iLO 2 MP Command menu.

   - Shut down HP-UX and reboot the server by issuing `shutdown -r`.

Booting and Shutting Down HP OpenVMS

NOTE: Before booting or installing the OpenVMS operating system on the server blade, see the following website for the Server Errata Sheet for OpenVMS on the HP Integrity BL860c Server: http://www.hp.com/go/blades-docs.

Once you have reached the Enterprise Servers, Workstations and Systems Hardware site, click the HP Integrity BL860c Server blade link and refer to documentation specific to OpenVMS.

This section has procedures for booting and shutting down HP OpenVMS on the server blade, and procedures for adding OpenVMS to the boot options list.

- To add an OpenVMS entry to the boot options list, see "Adding OpenVMS to the Boot Options List" (page 75).
- To boot HP OpenVMS on an entry-class HP Integrity server, see "Booting OpenVMS" (page 76).
- To shut down HP OpenVMS, see "Shutting Down OpenVMS" (page 77).

Adding OpenVMS to the Boot Options List

This procedure adds an OpenVMS item to the boot options list from the EFI Shell.

NOTE: If OpenVMS is already installed on the server blade, add OpenVMS to the boot options list using the command procedure `SYS$MANAGER:BOOT_OPTIONS.COM` and following the onscreen instructions.

1. Access the EFI Shell environment.

   Log in to the Integrity iLO 2 and enter **`CO`** to access the system console.

   When accessing the console, confirm that you are at the EFI Boot Manager Menu (the main EFI menu). If you are at another EFI menu, choose the **Exit** option from the submenus until you return to the screen with the EFI Boot Manager heading.

   From the EFI Boot Manager Menu, choose the **EFI Shell** menu option to access the EFI Shell environment.

2. Access the EFI System Partition (`fs`*`X`*`:` where *`X`* is the file system number) for the device from which you want to boot OpenVMS.

   For example, enter **`fs2:`** to access the EFI System Partition for the bootable file system number **2**. The EFI Shell prompt changes to reflect the file system currently accessed.

   The full path for the OpenVMS loader is `\EFI\VMS\VMS_LOADER.EFI` and it should be on the device you are accessing.

3. At the EFI Shell environment, use the `bcfg` command to manage the boot options list.

   The `bcfg` command includes the following options for managing the boot options list:

   - `bcfg boot dump` – Display all items in the boot options list for the server.
   - `bcfg boot rm #` – Remove the item number specified by # from the boot options list.

- `bcfg boot mv #a #b` – Move the item number specified by *#a* to the position specified by *#b* in the boot options list.
- `bcfg boot add # file.efi "Description"` – Add a new boot option to the position in the boot options list specified by *#*. The new boot option references *file.efi* and is listed with the title specified by *Description*.

  For example, `bcfg boot add 1 \EFI\VMS\VMS_LOADER.EFI "OpenVMS V8.3-1H1"` adds an OpenVMS item as the first entry in the boot options list.

For details, see the `help bcfg` command.

4. Exit the console and iLO 2 for Integrity interfaces if you are finished using them.

   Press **Ctrl-B** to exit the system console and return to the iLO 2 MP Main Menu. To exit the MP, enter **X** at the Main Menu.

For more details, see the *HP OpenVMS Version 8.3 for Integrity Servers Upgrade and Installation Manual* on the HP website at: http://h71000.www7.hp.com/doc/83final/ba322_90045/index.html.

Booting OpenVMS

To boot OpenVMS on the server blade, use either of the following procedures.

Booting OpenVMS (EFI Boot Manager)

To boot OpenVMS from the EFI Boot Manager Menu:

1. From the EFI Boot Manager Menu, choose an item from the boot options list to boot OpenVMS using the chosen boot option.
2. Access the EFI Boot Manager Menu for the server on which you want to boot OpenVMS.

   Log in to the iLO 2 MP and enter **CO** to choose the system console.

   NOTE: When accessing the console, confirm that you are at the EFI Boot Manager Menu (the main EFI menu). If you are at another EFI menu, choose the Exit option from the submenus until you return to the screen with the EFI Boot Manager heading.

3. At the EFI Boot Manager Menu, choose an item from the boot options list.

   Each item in the boot options list references a specific boot device and provides a specific set of boot options or arguments to use when booting the device.
4. Press **Enter** to initiate booting using the chosen boot option.
5. Exit the console and iLO 2 MP interfaces when finished using them.
6. Enter **Ctrl-B** to exit the system console and return to the MP Main Menu.
7. Exit iLO 2 MP by entering **X** at the MP Main Menu.

Booting HP OpenVMS (EFI Shell)

From the **EFI Shell** environment, to boot OpenVMS on a device, first access the bootable partition (for example `fs0:`) for the root device and enter **`\efi\vms\vms_loader.efi`** to initiate the OpenVMS loader.

1. Access the EFI Shell environment for the server on which you want to boot OpenVMS.

   Log in to the iLO 2 MP and enter **CO** to choose the system console.

   NOTE: When accessing the console, confirm that you are at the EFI Boot Manager Menu (the main EFI menu). If you are at another EFI menu, choose the Exit option from the submenus until you return to the screen with the EFI Boot Manager heading.

2. From the EFI Boot Manager Menu, choose the EFI Shell menu option to access the EFI Shell environment.

3. At the EFI Shell environment, issue the `map -Fs` command to list all currently mapped bootable devices.

   The bootable file systems are listed as `fs0:, fs1:`, and so on.

4. Access the bootable partition (`fsX`: where *X* is the file system number) for the device you want to boot OpenVMS.

   For example, enter **`fs2:`** to access the bootable partition for the bootable file system number 2.

   The EFI Shell prompt changes to reflect the file system currently accessed.

   NOTE: The file system number might change each time it is mapped (for example, when the server boots, or when the `map -r` command is issued).

5. When accessing the bootable partition for the desired boot device, issue the `\efi\vms\vms_loader` command to initiate the `vms_loader.efi` loader on the device you are accessing.

```
fs5:> \efi\vms\vms_loader.efi
    HP OpenVMS Industry Standard 64 Operating System, Version V8.3-1H1
    © Copyright 1976-2006 Hewlett-Packard Development Company, L. P.

%DECnet-I-LOADED, network base image loaded, version = 05.13.00

%SMP-I-CPUTRN, CPU #02 has joined the active set.
%SMP-I-CPUTRN, CPU #03 has joined the active set.
%SMP-I-CPUTRN, CPU #01 has joined the active set.
%SYSINIT-I- waiting to form or join an OpenVMS Cluster
%VMScluster-I-LOADSECDB, loading the cluster security database
%EWA0, Auto-negotiation mode assumed set by console
%EWA0, Merl5704 located in 64-bit, 66-mhz PCI-X slot
%EWA0, Device type is BCM5704C (UTP) Rev B0 (21000000)
%EWB0, Auto-negotiation mode assumed set by console
%EWB0, Merl5704 located in 64-bit, 66-mhz PCI-X slot
%EWB0, Device type is BCM5704C (UTP) Rev B0 (21000000)
%PKA0, Copyright (c) 2001 LSI Logic, PKM V1.1.01  Chip LSISAS1068
%EWA0, Link up: 1000 mbit, full duplex, flow control disabled
```

6. Exit the console and iLO 2 MP interfaces when finished using them.
7. Enter **Ctrl-B** to exit the system console and return to the MP Main Menu. To exit the iLO 2 MP, enter **`X`** at the MP Main Menu.

Shutting Down OpenVMS

This section describes how to shut down the HP OpenVMS operating system on the server blade. From the `OpenVMS DCL` prompt, issue the `@SYS$SYSTEM:SHUTDOWN` command to shut down the OpenVMS operating system.

1. Log in to OpenVMS running on the server that you want to shut down.

   Log in to the iLO 2 MP for the server and use the Console menu to access the system console. Accessing the console through the iLO 2 MP enables you to maintain console access to the server after HP OpenVMS has shut down.

2. At the OpenVMS DCL prompt issue the @SYS$SYSTEM:SHUTDOWN command and specify the shutdown options in response to the prompts given.

NOTE: Use the command in step 2 when you shut down OpenVMS the first time. If you have shut down OpenVMS more than once, use the $ shutdown command.

```
$@sys$system:shutdown

        SHUTDOWN -- Perform an Orderly System Shutdown
                    on node NODE1

How many minutes until final shutdown [0]:
Reason for shutdown [Standalone]:
Do you want to spin down the disk volumes [NO]?
Do you want to invoke the site-specific shutdown procedure [YES]?
Should an automatic system reboot be performed [NO]?
When will the system be rebooted [later]:
Shutdown options (enter as a comma-separated list):
 REMOVE_NODE         Remaining nodes in the cluster should adjust quorum
 CLUSTER_SHUTDOWN    Entire cluster is shutting down
 REBOOT_CHECK        Check existence of basic system files
 SAVE_FEEDBACK       Save AUTOGEN feedback information from this boot
 DISABLE_AUTOSTART   Disable autostart queues
 POWER_OFF           Request console to power-off the system
 BIB_STATE           Request console to reboot all CPUs to the Itanium BIB state

Shutdown options [NONE]: REBOOT_CHECK

%SHUTDOWN-I-BOOTCHECK, performing reboot consistency check...
%SHUTDOWN-I-CHECKOK, basic reboot consistency check completed

%SHUTDOWN-I-OPERATOR, this terminal is now an operator's console
%SHUTDOWN-I-DISLOGINS, interactive logins will now be disabled
%SET-I-INTSET, login interactive limit = 0, current interactive value = 1
%SHUTDOWN-I-SHUTNET, the DECnet network will now be shut down
```

NOTE: The @SYS$SYSTEM:SHUTDOWN command should only be used when shutting down OpenVMS for the first time. Use the $ shutdown command after the first shut down.

HP OpenVMS I64 currently does not support the POWER_OFF shutdown option.

Booting and Shutting Down Microsoft Windows

This section describes how to boot and shut down Microsoft Windows, and how to add Windows entries to the system boot options list.

Adding Microsoft Windows to the Boot Options List

To add a Microsoft Windows entry to the system boot options list you must do so from EFI by using the \MSUtil\nvrboot.efi utility to import boot options from the EFI\Microsoft\WINNT50\Boot00... file on the device from which Windows is loaded.

This procedure adds the Microsoft Windows item to the boot options list.

NOTE: On HP Integrity servers, the operating system installer automatically adds an entry to the boot options list.

1. Access the EFI Shell environment.

   Log in to the iLO 2 MP and enter **CO** to access the system console.

   When accessing the console, confirm that you are at the EFI Boot Manager Menu (the main EFI menu). If you are at another EFI menu, choose the **Exit** option from the submenus until you return to the screen with the EFI Boot Manager heading.

   From the EFI Boot Manager Menu, choose the **EFI Shell** menu option to access the EFI Shell environment.

2. Access the EFI System Partition (`fsX:` where *X* is the file system number) for the device from which you want to boot Windows.

   For example, enter **`fs2:`** to access the EFI System Partition for the bootable file system number 2. The EFI Shell prompt changes to reflect the file system currently accessed.

   The full path for the Microsoft Windows loader is `\efi\microsoft\winnt50\ia64ldr.efi` and it should be on the device you are accessing. However, you must only initiate this loader from the EFI Boot Menu and not from the EFI Shell.

3. List the contents of the `\EFI\Microsoft\WINNT50` directory to identify the name of the Windows boot option file (`Boot00nn`) that you want to import into the system boot options list.

```
fs0:\> ls EFI\Microsoft\WINNT50
Directory of: fs0:\EFI\Microsoft\WINNT50

  09/18/03  11:58a <DIR>          1,024  .
  09/18/03  11:58a <DIR>          1,024  ..
  12/18/03  08:16a                  354  Boot0001
         1 File(s)         354 bytes
         2 Dir(s)


fs0:\>
```

4. At the EFI Shell environment, issue the `\MSUtil\nvrboot.efi` command to launch the Microsoft Windows boot options utility.

```
fs0:\> msutil\nvrboot

NVRBOOT: OS Boot Options Maintenance Tool [Version 5.2.3683]

   1. SUSE SLES 10
   2. HP-UX Primary Boot: 0/0/1/0/0.2.0
 * 3. Windows Server 2003, Datacenter
   4. EFI Shell [Built-in]

  * = Windows OS boot option

  (D)isplay (M)odify (C)opy E(x)port (I)mport (E)rase (P)ush (H)elp (Q)uit

Select>
```

5. Use the `Import` command to import the Window boot option file.

```
Select> i
Enter IMPORT file path: \EFI\Microsoft\WINNT50\Boot0001
Imported Boot Options from file: \EFI\Microsoft\WINNT50\Boot0001

Press enter to continue
```

NOTE: Due to the type of server you purchased, your output may not exactly match the output shown here.

6. Enter **`Q`** to quit the NVRBOOT utility, and exit the console and iLO 2 MP interfaces if you are finished using them.

   Enter **Ctrl-B** to exit the system console and return to the iLO 2 MP Main Menu. To exit the iLO 2 MP, enter **`x`** at the Main Menu.

Booting the Microsoft Windows Operating System

Boot the Windows Server 2003 operating system on an HP Integrity server by using the EFI Boot Manager Menu to choose the appropriate Windows item from the boot options list. For details on shutting down the Windows operating system, see"Shutting Down Microsoft Windows" (page 80).

1. From the EFI Boot Manager Menu, choose an item from the boot options list to boot Windows using the chosen boot option.
2. Access the EFI Boot Manager Menu for the server on which you want to boot Windows.

   Log in to the iLO 2 MP and enter `CO` to choose the system console.

   When accessing the console, confirm that you are at the EFI Boot Manager Menu (the main EFI menu). If you are at another EFI menu, choose the **Exit** option from the submenus until you return to the screen with the EFI Boot Manager heading.
3. At the EFI Boot Manager Menu, choose an item from the boot options list.

   Each item in the boot options list references a specific boot device and provides a specific set of boot options or arguments to be used when booting the device.
4. Press **Enter** to initiate booting using the chosen boot option.
5. Once Windows begins loading, wait for the Special Administration Console (SAC) to become available.

   The SAC interface provides a text-based administration tool that is available from the system console. For details see the SAC online help (enter `?` at the `SAC>` prompt).

```
Loading.: Windows Server 2003, Datacenter
Starting: Windows Server 2003, Datacenter

                                Starting Windows...
********************************************************************************

Computer is booting, SAC started and initialized.

Use the "ch -?" command for information about using channels.
Use the "?" command for general help.

SAC>
```

   NOTE: Due to the type of server you purchased, your output may not exactly match the output shown here.
6. Exit the console and iLO 2 MP interfaces when finished using them.

   Enter **Ctrl-B** to exit the console and return to the MP Main Menu. To exit the iLO 2 MP, enter **x** at the Main Menu.

Shutting Down Microsoft Windows

Shut down the Windows operating system on HP Integrity servers by using the Start menu or the `shutdown` command.

△ **CAUTION:** Do not shut down Windows using Special Administration Console (SAC) `restart` or `shutdown` commands under normal circumstances.

Issuing `restart` or `shutdown` at the `SAC>` prompt causes the server to restart or shutdown immediately and can result in the loss of data.

Instead use the Windows Start menu or the `shutdown` command to shut down gracefully.

To shut down Windows use either of the following methods.

- Choose **Shut Down** from the **Start** menu and choose either **Restart** or **Shut down** from the pull-down menu.

  The Restart menu item shuts down and restarts the server. The Shut down menu item shuts down the server.

You can use this method when using a graphical interface to the server.

- Issue the `shutdown`command from the Windows command line.

  You can issue this command from a command prompt through the Special Administration Console (SAC) or from any other command line.

  The Windows `shutdown` command includes the following options:

  `/s` Shuts down and halts (power off) the server. This is the equivalent of **Start—>Shut Down, Shut down**. To power on the server, use the iLO 2 MP `PC` command.

  `/r` Shuts down and restarts the server. This is the equivalent of **Start—>Shut Down, Restart**.

  `/a` Aborts a server shutdown.

  `/t xxx` Sets the timeout period before shutdown to *xxx* seconds. The timeout period ranges from 0–600, with a default of 30.

  For details, see the `help shutdown` Windows command.

Shutting Down Windows from the Command Line

From the Windows command line, issue the `shutdown` command to shut down the operating system.

1. Log in to Windows running on the server that you want to shut down.

   For example, access the system console and use the Windows SAC interface to start a command prompt, from which you can issue Windows commands to shut down the server.

2. Check to see whether any users are logged in.

   Use the `query user` or `query session` command.

3. Issue the `shutdown` command and the appropriate options to shut down the Windows Server 2003 on the server.

   You have the following options when shutting down Windows:

   - To shut down Windows and reboot: `shutdown /r` or choose the **Start —> Shut Down** action and choose **Restart** from the pull-down menu.
   - To shut down Windows and halt (power off server hardware): `shutdown /s` or choose the **Start —> Shut Down** action and choose **Shut down** from the pull-down menu.

     To reboot a halted server you must power on the server using the `PC` command at the iLO 2 MP Command menu.

   - To abort a shutdown (stop a shutdown that has been initiated): `shutdown /a`

   For example:

   ```
   shutdown /r /t 60 /c "Shut down in one minute."
   ```

   This command initiates a Windows system shutdown and reboot after a timeout period of 60 seconds. The `/c` option specifies a message that is broadcast to any other users of the server.

Booting and Shutting Down Linux

This section covers booting and shutting down Linux on the server blade. Procedures for Red Hat Enterprise Linux and SuSE Linux Enterprise Server are given in this section.

- To add a Linux entry to the boot options list, see "Adding Linux to the Boot Options List" (page 82).
- To boot Linux:
  - For details on Red Hat Enterprise Linux, see "Booting the Red Hat Enterprise Linux Operating System" (page 83).
  - For details on SuSE Linux Enterprise Server, see "Booting the SuSE Linux Enterprise Server Operating System" (page 84).
- To shut down either Red Hat Enterprise Linux or SuSE Linux Enterprise Server, see "Shutting Down Linux" (page 85).

Adding Linux to the Boot Options List

This section describes how to add a Linux entry to the system boot options list. The processes for adding both Red Hat Enterprise Linux and SuSE Linux Enterprise Servers are given here.

You can add the `\EFI\redhat\elilo.efi` loader or the `\efi\SuSE\elilo.efi` loader to the boot options list from the EFI Shell or EFI Boot Configuration menu (or in some versions of EFI, the Boot Option Maintenance Menu).

NOTE: On HP Integrity servers, the operating system installer automatically adds an entry to the boot options list.

1. Access the EFI Shell environment.

   Log in to the iLO 2 MP and enter `CO` to access the system console.

   When accessing the console, confirm that you are at the EFI Boot Manager Menu (the main EFI menu). If you are at another EFI menu, choose the **Exit** option from the submenus until you return to the screen with the EFI Boot Manager heading.

   From the EFI Boot Manager Menu, choose the **EFI Shell** menu option to access the EFI Shell environment.

2. Access the EFI System Partition (`fs`*X*`:` where *X* is the file system number) for the device from which you want to boot Linux.

   For example, enter **`fs2:`** to access the EFI System Partition for the bootable file system number **2**. The EFI Shell prompt changes to reflect the file system currently accessed.

   The full path for the Red Hat Enterprise Linux loader is `\EFI\redhat\elilo.efi` and it should be on the device you are accessing.

   The full path for the SuSE Linux Enterprise Server loader is `\efi\SuSE\elilo.efi` and it should be on the device you are accessing.

3. At the EFI Shell environment, use the `bcfg` command to manage the boot options list.

   The `bcfg` command includes the following options for managing the boot options list:

   - `bcfg boot dump` – Displays all items in the boot options list for the server.
   - `bcfg boot rm #` – Removes the item number specified by #from the boot options list.

- `bcfg boot mv #a #b` – Moves the item number specified by *#a* to the position specified by *#b* in the boot options list.
- `bcfg boot add # file.efi "Description"` – Adds a new boot option to the position in the boot options list specified by *#*. The new boot option references *file.efi* and is listed with the title specified by *Description*.

  For example, `bcfg boot add 1 \EFI\redhat\elilo.efi "Red Hat Enterprise Linux"` adds a Red Hat Enterprise Linux item as the first entry in the boot options list.

  Likewise, `bcfg boot add 1 \efi\SuSE\elilo.efi "SLES 10"` adds a SuSE Linux item as the first entry in the boot options list.

For details, see the `help bcfg` command.

4. Exit the console and iLO 2 MP interfaces if you are finished using them.

   Enter **Ctrl-B** to exit the system console and return to the MP Main Menu. To exit the iLO 2 MP, enter **x** at the Main Menu.

Booting the Red Hat Enterprise Linux Operating System

You can boot the Red Hat Enterprise Linux operating system on HP Integrity servers using either of these methods:

- Choose a Red Hat Enterprise Linux entry from the EFI Boot Manager Menu.

  To load the Red Hat Enterprise Linux operating system at the EFI Boot Manager Menu, choose its entry from the list of boot options.

  Choosing a Linux entry from the boot options list boots the operating system using `ELILO.EFI` loader and the `elilo.conf` file.

- Initiate the `ELILO.EFI` Linux loader from the EFI Shell.

  On a Red Hat Enterprise Linux boot device EFI System Partition, the full paths to the loader and configuration files are: `\EFI\redhat\elilo.efi` and `\EFI\redhat\elilo.conf`.

  After choosing the file system for the boot device (for example, `fs0:`) initiate the Linux loader from the EFI Shell prompt by entering the full path for the `ELILO.EFI` loader.

By default the `ELILO.EFI` loader boots Linux using the kernel image and parameters specified by the default entry in the `elilo.conf` file on the EFI System Partition for the boot device.

To interact with the `ELILO.EFI` loader, interrupt the boot process (for example, enter a space) at the `ELILO boot` prompt. To exit the `ELILO.EFI` loader, use the `exit` command.

Booting Red Hat Enterprise Linux from the EFI Shell

To boot Red Hat Enterprise Linux from the EFI Shell:

1. Access the EFI Shell.

   From the system console, choose the **EFI Shell** entry from the EFI Boot Manager Menu to access the shell.

2. Access the EFI System Partition for the Red Hat Enterprise Linux boot device.

   Use the EFI Shell `map` command to list the file systems (`fs0`, `fs1`, and so on) that are known and mapped.

   To choose a file system to use, enter its mapped name followed by a colon (`:`). For example, to operate with the boot device that is mapped as `fs3`, enter `fs3:` at the EFI Shell prompt.

3. Enter `ELILO` at the EFI Shell command prompt to launch the `ELILO.EFI` loader.

   If needed, you can specify the loader path by entering `\EFI\redhat\elilo` at the EFI Shell command prompt.

4. Allow the `ELILO.EFI` loader to proceed with booting the Red Hat Enterprise Linux kernel.

   By default, the `ELILO.EFI` loader boots the kernel image and options specified by the default item in the `elilo.conf` file.

   To interact with the `ELILO.EFI` loader, interrupt the boot process (for example, enter a space) at the `ELILO boot` prompt. To exit the loader, use the `exit` command.

Booting the SuSE Linux Enterprise Server Operating System

You can boot the SuSE Linux Enterprise Server 10 operating system on HP Integrity servers using either of these methods:

- Choose a SuSE Linux Enterprise Server entry from the EFI Boot Manager Menu.

  To load the SuSE Linux Enterprise Server operating system at the EFI Boot Manager Menu, choose its entry from the list of boot options.

  Choosing a Linux entry from the boot options list boots the operating system using `ELILO.EFI` loader and the `elilo.conf` file.

- Initiate the `ELILO.EFI` Linux loader from the EFI Shell. For details, see "Booting SuSE Linux Enterprise Server from the EFI Shell" (page 84).

  On a SuSE Linux Enterprise Server boot device EFI System Partition, the full paths to the loader and configuration files are: `\efi\SuSE\elilo.efi` and `\efi\SuSE\elilo.conf`.

  After choosing the file system for the boot device (for example, `fs0:`) you can initiate the Linux loader from the EFI Shell prompt by entering the full path for the `ELILO.EFI` loader.

By default, the `ELILO.EFI` loader boots Linux using the kernel image and parameters specified by the default entry in the `elilo.conf` file on the EFI System Partition for the boot device.

To interact with the `ELILO.EFI` loader, interrupt the boot process (for example, enter a space) at the `ELILO boot` prompt. To exit the `ELILO.EFI` loader, use the `exit` command.

Booting SuSE Linux Enterprise Server from the EFI Shell

To boot SuSE Linux Enterprise Server 10 from the EFI Shell:

1. Access the EFI Shell.

   From the system console, choose the **EFI Shell** entry from the EFI Boot Manager Menu to access the shell.

2. Access the EFI System Partition for the SuSE Linux Enterprise Server boot device.

   Use the `map` EFI Shell command to list the file systems (`fs0`, `fs1`, and so on) that are known and mapped.

   To choose a file system to use, enter its mapped name followed by a colon (`:`). For example, to operate with the boot device that is mapped as `fs3`, enter **`fs3:`** at the EFI Shell prompt.

3. Enter **`ELILO`** at the EFI Shell command prompt to launch the `ELILO.EFI` loader.

   If needed, you can specify the loader path by entering `\efi\SuSE\elilo` at the EFI Shell command prompt.

4. Allow the `ELILO.EFI` loader to proceed with booting the SuSE Linux kernel.

   By default, the `ELILO.EFI` loader boots the kernel image and options specified by the default item in the `elilo.conf` file.

   To interact with the `ELILO.EFI` loader, interrupt the boot process (for example, enter a space) at the `ELILO boot` prompt. To exit the loader, use the `exit` command.

Shutting Down Linux

Use the `shutdown` command to shut down Red Hat Enterprise Linux or SuSE Linux Enterprise Server.

The Red Hat Enterprise Linux and SuSE Linux Enterprise Server `shutdown` command has the following options:

`-h` Halts (power off) after shutdown.

Use the `PC` command at the iLO 2 MP Command menu to manually power on or power off server hardware, as needed.

`-r` Reboots after shutdown

`-c` Cancels an already running shutdown

`time` When to shut down (required.) You can specify *`time`* in any of the following ways:

- Absolute time in the format *`hh:mm`*. *`hh`* is the hour (one or two digits) and *`mm`* is the minutes (two digits).
- Number of minutes to wait in the format ***`+mm`***, in which *`mm`* is the number of minutes.
- **`now`** to immediately shut down; this is equivalent to using **`+0`** to wait zero minutes.

For details, see the *shutdown*(8) Linux manpage. Also see the Linux manpage for the `poweroff` command.

1. From the command line for Red Hat Enterprise Linux or SuSE Linux Enterprise Server, issue the `shutdown` command to shut down the operating system.
2. Log in to Linux running on the server you want to shut down.
3. Issue the `shutdown` command with the desired command-line options, and include the required *`time`* argument to specify when the operating system shutdown is to occur.

   For example, `shutdown -r +20` shuts down and reboots the server in twenty minutes.

5 Troubleshooting

This chapter provides a preferred methodology (strategies and procedures) and tools for troubleshooting server blade error and fault conditions.

Methodology

General Troubleshooting Methodology

There are multiple entry points to the troubleshooting process, dependent upon your level of troubleshooting expertise; the tools, processes, and procedures which you have at your disposal; and the nature of the server fault or failure.

1. Typically, you select from a set of symptoms, ranging from very simple, server LED is blinking; to the most difficult, Machine Check Abort (MCA) has occurred. The following is a list of symptom examples:
   - Front Panel LED blinking
   - System Alert present on system console
   - Server blade won't power-up
   - Server blade won't boot
   - Error/Event Message received
   - MCA occurred
2. Narrow down the observed problem to the specific troubleshooting procedure required. Isolate the failure to a specific part of the server blade to perform more detailed troubleshooting. For example:
   - Problem - Front Panel LED blinking

     NOTE: The front panel health LED flashes amber with a warning indication, or flashes red with a fault indication.

     - System Alert on system console?
     - Analyze the alert by using the system event log (SEL), to identify the last error logged by the server blade. Use the iLO 2 MP commands to view the SEL, through the MP's text interface.
3. You should have a good idea about which area of the server blade requires further analysis. For example, if the symptom was "server blade won't power-up", the initial troubleshooting procedure may have indicated a problem with the DC power rail not coming up after the power was turned on.
4. You have now reached the point where the failed Field Replaceable Unit (FRU or FRUs) has been identified and needs to be replaced. You must now perform the specific removal and replacement procedure, and verification steps (see Chapter 6: "Removing and Replacing Components" (page 108)).

   NOTE: If multiple FRUs are identified as part of the solution, fix all identified failed FRUs to guarantee success.
5. There may be specific recovery procedures you need to perform to finish the repair.

Should a failure occur, the front panel LEDs and the SEL helps you identify the problem or FRU:

- The front panel LEDs and LAN LEDs of the server blade change color and blink to help identify specific problems, and display LAN activity.
- The SEL provides detailed information about the errors identified by the LEDs.

For server alerts of levels 3-5, the attention condition on the server LED can be cleared by accessing the logs using the `sl` command, available in the iLO 2 MP command mode. To access the iLO 2 MP from the console serial port, enter **Ctrl-B** or **ESC-(**.

If the LEDs and SEL do not give you enough information for you to identify the problem you are experiencing, HP also provides diagnostic tools with each operating system (see "Troubleshooting Tools" (page 91)).

NOTE: Always check the iLO 2 MP SEL in the case of a blinking yellow or red front panel health LED, before replacing any hardware.

Recommended Troubleshooting Methodology

The recommended methodology for troubleshooting a server blade error or fault is as follows:

1. Consult the system console for any messages, emails, etc., pertaining to a server blade error or fault.
2. View the front panel LEDs (power and health), locally; or remotely through the iLO 2 MP `vfp` command.
3. Compare the state of the server blade's LEDs (off; flashing or steady; red, green, or amber) with the LED states listed in Table 12 (page 88).
4. Go to the step number of Table 13 (page 88), as specified in the right column of Table 12 (page 88), located in the row which corresponds to your front panel LED display state.
5. Read the symptom/condition information in the left column of Table 13 (page 88).
6. Perform the action(s) specified in the Action column.
7. If more details are required or desired, see the appropriate subsection of this chapter, where this information is provided in the Action column. The Action you are directed to perform may be to access and read one or more error logs (the event log and/or the forward progress log).

You can follow the recommended troubleshooting methodology, and use Table 13 and Table 14 (page 90), or go directly to the subsection of this chapter which corresponds to your own entry point of choice. Table 11 provides the corresponding subsection or location title for these different entry points (for example, to start by examining the logs, go directly to "Errors and Error Logs" (page 98)).

Table 11 Troubleshooting Entry Points

Entry Point	Subsection or Location
Front panel LEDs	See "Basic and Advanced Troubleshooting Tables" (page 88) and "Troubleshooting Tools" (page 91).
System Event Log and Forward Progress Logs	See "Errors and Error Logs" (page 98).
Offline and Online Diagnostics	See "Troubleshooting Tools" (page 91).
System Event Analyzer (SEA)	See http://www.compaq.com/support/svctools/webes for more information about this tool.

Basic and Advanced Troubleshooting Tables

Use the following troubleshooting tables to determine the symptoms or condition of a suspect server blade. Be aware that the state of the front panel LEDs can be viewed locally; or remotely using the `vfp` command from the MP.

The tables are designed to cover troubleshooting symptoms from AC power-on up to booting the OS, specifically in Steps 1-5. In most cases, Table 12: "Basic Front Panel LED Troubleshooting States", identifies the step number where troubleshooting should begin. Alternatively, you can skip Table 12, and start with Step 1 in Table 13: "Basic Low End Troubleshooting", sequencing through the table steps to locate the symptom/condition most descriptive of your current server blade status. This becomes the first step in your troubleshooting procedure. Where appropriate, an action or actions prescribed in the Action column of Table 13: "Basic Low End Troubleshooting", is followed by a reference to the corresponding subsection of this chapter for further information.

NOTE: In Table 12, the Unit Identifier (UID)/Locator LED has not been included, because it is not used directly for troubleshooting server blades. However, indirectly, it can provide useful system information (for example when it is blue, this indicates the BMC is working). It also indicates the server blade which has an error or fault condition by illuminating steady blue on the front of the server blade in question.

Table 12 Basic Front Panel LED Troubleshooting States

Server Health	Internal Health	Basic Low End Troubleshooting Table Step Number
Off	Off	Step 1 in Table 13 and Step 6 in Table 14
Off	Steady amber	Step 2 in Table 13
Off	Steady green	Step 3a in Table 13
Flashing amber	Steady green	Step 3b in Table 13
Steady green	Steady green	Steps 4a, 4b, 4c, and 5 in Table 13, and Steps 6 and 7 in Table 14
Flashing red	Steady green	Steps 8a and 8b in Table 14

Table 13 Basic Low End Troubleshooting

Step	Condition	Action
1	Server blade appears "dead" – no front panel LEDs are on, and no fans are running. BMC and iLO 2 MP are running.	Nothing is logged for this condition. 1. For new server installations, review the installation procedures. 2. Verify that the enclosure power cord(s) are connected to both the power supplies and to the AC receptacle(s). 3. Verify that AC power, at the proper AC voltage levels, is available to the receptacle(s). 4. If the Power button's integrated LED on front panel remains off, then reseat the server blade. 5. As a last resort, replace the server blade. The preceding problem is fixed when the front panel LED states are as follows: Server health is off and Internal health is steady amber.
2	Server blade does not power on after front panel Power button is momentarily pressed (less than four seconds). BMC is running, if locator LED (UID) can be turned on or off through the system console.	A fatal fault has been detected and logged, attempting to power on the server. 1. Examine enclosure power supply LEDs. If they are not steady green, then replace power supply. 2. If the enclosure power supply LED is green, then you may need an additional power supply to supply sufficient power to run the blades in the enclosure.

Table 13 Basic Low End Troubleshooting *(continued)*

Step	Condition	Action
		3. Examine the iLO 2 MP subsystem logs for events related to DC power rails. Preceding problem is fixed when the front panel LEDs are as follows: Health is off and power is steady green.
3a	Server health LED is off and Internal health LED is steady green, iLO 2 MP is not running.	A fatal fault has been detected and logged while booting or running System F/W. 1. Cannot access the iLO 2 MP at this time (see "Troubleshooting Management Subsystem " (page 105)). 2. Must reseat or replace the server blade. Preceding problem is fixed when iLO 2 MP logs can be read and both front panel health LED and server power LED states show: Flashing green or steady green, and steady green, respectively.
3b	Server health LED is flashing amber and Internal health LED is steady green. The BMC and iLO 2 MP are running.	A warning or critical failure has been detected and logged while booting or running system firmware. Examine the iLO 2 MP logs for events related to switched DC power or cooling fans or configuration. Preceding problem is fixed when both front panel health LED and server power LED states show: Flashing green or steady green, and steady green, respectively.
4a	Cannot see iLO 2 MP prompt on system console -- blade server power is on. BMC and iLO 2 MP are running.	Nothing may be logged for this condition. Since the BMC controls the different states of the server health LED, the server health LED state indicates that the server blade is either booting or running system F/W, or booting or running OS. 1. Look for loose, damaged, or disconnected signal cables between the system console device, and serial port connector on the front panel. 2. Verify proper 'Terminal type is set: supported settings are hpterm and VT100+ (default) and VTUTF8. 3. Verify that the RS232C configuration matches between the server blade and the local console (see "Troubleshooting the Server Interface (System Console)" (page 106)). 4. As a last resort, replace the server blade. Preceding problem is fixed when the iLO 2 MP menu appears on the system console.
4b	Cannot see EFI prompt on system console. BMC and iLO 2 MP are running.	Nothing may be logged for this condition. 1. Examine the iLO 2 MP logs for entries related to processors, processor power modules (PPM)s, and shared memory, and core I/O devices (see "Errors and Error Logs" (page 98)). 2. As a last resort, replace the server blade. Preceding problem is fixed when the EFI menu appears on the system console.
4c	Cannot find a boot disk. BMC and iLO 2 MP are running.	Nothing may be logged for this condition. 1. Reinsert the boot disk into the drive bay (see "Supported Configurations" (page 101)). 2. Search for the boot disk ACPI path using the EFI Shell (`map -r`) command (see Table 26 (page 104)). 3. Examine the iLO 2 MP logs for entries related to processors, processor power modules (PPM)s, and shared memory, and core I/O devices (see "Errors and Error Logs" (page 98)).

Table 13 Basic Low End Troubleshooting *(continued)*

Step	Condition	Action
		4. As a last resort, replace the server blade. Preceding problem is fixed when all boot paths are found.
5	Cannot see OS prompt on system console. BMC and iLO 2 MP are running.	Nothing may be logged for this condition. 1. Examine the iLO 2 MP logs for entries related to processors, processor power modules (PPM)s, and shared memory, and core I/O devices (see "Errors and Error Logs" (page 98)). Preceding problem is fixed when the OS prompt appears on the system console.

Table 14 Advanced Low End Troubleshooting

Step	Symptom/Condition	Action
6	Cannot read System Event Log from the system console.	System event logging has stopped and a BMC malfunction is assumed (health is steady green and power is steady green). 1. Examine console messages for any EFI errors or warnings about BMC operation or communications. 2. Test the operation of the BMC by toggling the UID locator LED on the front panel – the blue LED is turned On/Off by the BMC through the system console. Preceding problem is fixed when the System Event Log resumes logging.
7	OS is non-responsive (hung)	Front panel LEDs indicate that the server blade's power is turned on, and it is either booting or running the OS (for example, health is steady green and power is steady green). Nothing may be logged for this condition. 1. Use the system console to start a system initialization, or push the Init (ToC) pinhole button on the front of the server blade. 2. Reboot the OS and escalate. 3. Obtain the system hardware status dump for root cause analysis. 4. Examine the iLO 2 MP logs for entries related to processors, processor power modules (PPMs), shared memory, and core I/O devices (see "Errors and Error Logs" (page 98)). The preceding problem is fixed when the root cause is determined.
8a	MCA occurs during server blade operation; the server blade reboots the OS. **Note:** Server blade reboots OS if enabled.	Front panel LEDs indicate that the server blade detected a fatal error that it cannot recover from through OS recovery routines (for example, health is flashing red and power is steady green). 1. Capture the MCA dump with the EFI command, `errdumpmca`. If the server blade can boot the OS, you can capture binary MCA dump files online. 2. Examine the iLO 2 MP logs for entries related to processors, processor power modules (PPMs), shared memory, and core I/O devices (See "Errors and Error Logs" (page 98)). Preceding problem is fixed when the MCA does not repeat, or the source of the MCA has been determined and dealt with.
8b	MCA occurs during server blade operation; server blade reboot of OS is prevented. **Note:** The troubleshooting actions for this step are identical to those in Step 8a, except that the server blade in this step must be hard reset to begin the booting process.	Front panel LEDs indicate that the server blade detected a fatal, front side bus error, caused by MBEs reading cache or DIMM; or by any parity in the I/O path between SBA, LBA, or HBA (for example, health is Off Power is Steady Green). System firmware is running to gather and log all error data for this MCA event. 1. Examine the iLO 2 MP logs for entries related to processors, processor power modules (PPMs), shared memory, and core I/O devices (see "Errors and Error Logs" (page 98)).

Table 14 Advanced Low End Troubleshooting *(continued)*

Step	Symptom/Condition	Action
	You must hard reset the server blade to clear the fatal condition and boot the OS.	Preceding problem is fixed when the MCA does not repeat.

Troubleshooting Tools

The HP Integrity BL860c server blade uses LEDs and other tools to help troubleshoot problems that occur in the server blade.

Front Panel LEDs

The front panel of the server blade contains the unit identifier (UID) LED, server health LED, internal health LED, and the network interface controller (NIC) LEDs. Figure 33 shows the front panel LED locations.

Server blades use flashing states (amber or red) on these LEDs to indicate a warning or an error.

There are a total of seven buttons, arranged vertically (when the server blade is installed in the enclosure).

The BMC controls the server health LED, blade hardware controls the power LED. Both BMC and iLO 2 MP code determine the state of the health LED.

Figure 33 Server Blade Front Panel LEDs

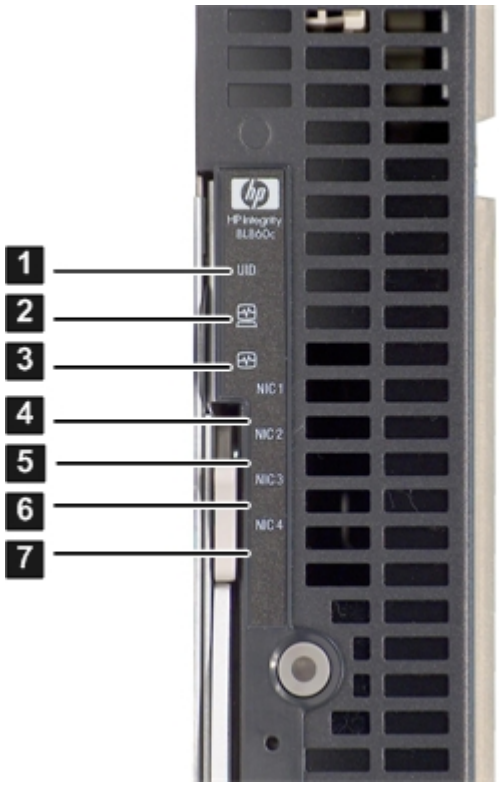


Table 15 details the functions of the front panel LEDs.

Table 15 Server Blade Front Panel LEDs

Item	LED Description	Status
1	Unit Identification (UID)	Steady Blue = Flagged

Table 15 Server Blade Front Panel LEDs *(continued)*

Item	LED Description	Status
		Off = Not flagged
2	Server health	Off = Power is off Steady Green = Power is on Flashing Amber = Server is degraded (power is on or off) Flashing Red = Server critical (power is on or off)
3	Internal health	Green = On Amber = Standby power (main power off, iLO 2 MP power on) Flashing Red = Critical internal error Off = Unit off (no power from enclosure)
4 – 7	NIC 1 NIC 2 NIC 3 NIC 4	Steady Green = Linked to network Flashing Green = Network activity Off = No network activity

Locator LED

The locator LED, or unit identifier (UID) allows a specific server blade to be identified in a rack or data center environment. One Locator LED is located in the front panel.

Table 16 Locator LED Status

LED Description	Status
Steady Blue	Identification
Off	Not flagged

NOTE: When the UID is lit, this also indicates that the BMC is working properly.

Server Health LED

The server blade uses the Server Health LED for the following reasons:

- To carry forward the Attention functionality of legacy Integrity front panel designs.
- To indicate whether the server is on or off.
- To provide a visual alert for faults that software/firmware is not sure if a FRU must be reseated/replaced.

The server health LED indicates the overall health state of the server blade, including the state of server firmware and the OS. If the LED is amber or red, the server blade needs attention. Examine the event logs (on iLO 2 MP) for details of the problem. Table 17 details the functions of the health LED.

Table 17 Server Health LED States

LED	Flash Rate	Status
	LED Off	Server blade is off
Green	Steady	Server blade has left the firmware boot, and an OS is booting or running with no failures (since SEL logs last examined)
Amber	Flash (1/sec)	A warning or critical failure has been detected and logged
Red	Flash (2/sec)	A fatal fault has been detected and logged

Internal Health LED

The internal health LED indicates the internal health of the server blade. If the LED is red, the server blade needs attention. Examine the event logs (on iLO 2 MP) for details of the problem. Table 18 details the states of the internal health LEDs.

Table 18 Internal Health LED States

LED	Status
Green	Server is on and health is good
Amber	Server degraded, check System Event Log
Flashing red	Critical internal error, check System Event Log
Off	Server is off, and health last known state is good

NIC LEDs

Table 19 shows the NIC LED status on the server blade.

Table 19 NIC LEDs

LEDs	Status
Steady green	NIC is connected to the network
Flashing green	Network activity
Off	No network activity

SAS Disk Drive LEDs

The two SAS disk drives on the server blade have identical LEDs that show the drive status. Figure 34 shows the location drive LEDs.

Figure 34 SAS Disk Drive LEDs

1 Activity LED 2 Status LED

Table 20 details the functions of the hard disk drive LEDs.

Table 20 SAS Disk Drive LEDs

Activity LED	Status LED	SAS Disk Drive State
Off	Off	Offline or not configured
Solid green	Off	Normal operation; no disk activity
Flickering green	Off	Normal operation; disk read or write activity
Off	Flashing amber - 1/sec	Offline, no disk activity; predictive failure
Solid green	Flashing amber - 1/sec	Online, no disk activity; predictive failure
Flickering green	Flashing amber - 1/sec	Disk activity; predictive failure
Off	Solid amber	Offline; no disk activity; critical fault
Off	Solid blue	Offline; drive selected by locator function
Flashing green - 1/sec	Off	Drive rebuilding

LAN LEDs

There are four LAN LEDs on the front panel of the server blade. They are NIC 1 through NIC 4. Table 21 details the functions of the LAN LEDs.

Table 21 1 GB LAN States

LED Color	State
Off	No link
Steady Green	Link found
Flashing Green	LAN activity on network link

Boot Process LEDs

Table 22 shows the normal boot process, as reflected in changes to front panel LED states:

Table 22 Normal Boot Process LED States

Step	Health	Power	Normal Power-Up Through HP-UX Boot
1	Off	Off	No AC power to the server blade.
2	Off	Amber	Server blade is shut down (server is off), AC power and standby power is active, last health status was healthy.
3	Off	Steady Green	Server blade power rails are on when Power switch is toggled. Hardware drives power LED.
4	Steady green	Steady green	Server blade has powered up and is either at EFI, booting, or at OS.

The following list itemizes the steps that characterize basic platform boot flow:

1. Server blade power switch requests power from the Management Module (the microcontroller that manages the enclosure power and cooling). Once the power is request is granted, server blade power turns on. After the power sequence has completed successfully, BMC releases system reset.
2. Initial processor firmware code fetch is Platform Abstraction Layer (PAL) code from FEPROM in processor-dependent hardware (PDH), retrieved 4 bytes at a time by the data multiplexer/demultiplexer controller (DMDC) in zx1. No shared memory or I/O devices are available at this time. They are not initially configured.
3. Firmware code stack is initially in battery-backed RAM (BBRAM) in PDH, retrieved 4 byes at a time, through the PDH and DMD buses.

4. PAL code configures all processors.
5. System Abstraction layer (SAL) code configures all platform central electronic complex (CEC) chips, including shared memory and all responding I/O devices.
6. Firmware code and stack are relocated to shared memory, after all x4 DIMM ranks in shared memory are configured and tested.
7. EFI Shell is launched from shared memory, and cache lines are retrieved 128 bytes at a time by the memory controller in zx1.
8. HP-UX loader is launched using the EFI device driver.
9. HP-UX boots and starts its own device drivers.
10. HP-UX may use runtime PAL and SAL calls, and APCI features (these abstraction layers allow platform independence).

Diagnostics

A suite of offline and online support tools are available to enable manufacturing, field support personnel, and you to troubleshoot server blade problems. In general, if the operating system (HP-UX) is already running, it is best not to shut it down. Use the online support tools.

If the OS cannot be booted, use the offline support tools to resolve the problem. The offline support tools are available from the EFI partition. Once you resolve the problem preventing booting, boot HP-UX, and use the online support tools for any further testing.

If it is not possible to reach the EFI from either the main disk or from LAN, you must troubleshoot, using the visual fault indicators, console messages, and system error logs that are available.

Online Diagnostics/Exercisers

Online support tools are provided on the server blade. Centralized error archiving and hardware inventory tools are available as long as the agents/providers that support them are installed on the managed server blade.

On HP-UX servers, the legacy tools within OnlineDiag continue to be supported. The online support tools, on HP-UX 11.23 and greater, include the Support Tool Manager (STM) tools, and the additional Web-Based Enterprise Management (WBEM) features added by SysFaultMgmt.

The STM suite of tools includes verifiers, diagnostics, exercisers, information modules, and expert tools.

Verifiers quickly determine whether or not a specific device is operational by performing tasks similar in nature to the way applications use the device. No license is required to run the verifiers.

Diagnostics are tools designed to identify faulty or failed FRUs.

Exercisers stress devices in order to facilitate the reproduction of intermittent problems.

Information modules create a log of information specific to one device, including:

- The product identifier
- A description of the device
- The hardware path to the device
- The vendor
- Onboard log information (if applicable)
- Miscellaneous information associated with the device
- The firmware revision code, if firmware is present in the device, is also displayed

Expert tools are device-specific troubleshooting utilities for use by sophisticated users. Their functionality varies from tool to tool, but they are intended to be interactive, and rely on users to provide information necessary to perform a particular task. These tools require users to have the appropriate license, if they wish to run them.

Online Support Tool Availability

Online diagnostics are included in the HP-UX OE media, and are installed by default.

Online Support Tools List

The following online support tools are available on HP-UX 11.23 and HP-UX 11.31 hosted server blades. In some cases, a tool, such as a disk exerciser, is generic to many types of hardware; in other cases, a tool, such as a tape diagnostic, is specific to a particular technology or type of tape drive. Table 23 details the online support tools available for the server blade.

Table 23 Online Support Tools List

Functional Area	Information	Verify	Exercise	Diagnose	Expert
Server	Yes	No	No	No	No
CPU/FPU	No	No	Yes	No	Yes
Memory	Yes	No	Yes	No	No
Graphics	Yes	Yes	Yes	No	No
Core I/O LAN	Yes	Yes	Yes	Yes	No
Disk/Arrays	Yes	Yes	Yes	No	No
Tape	Yes	Yes	Yes	Yes	Yes
M/O	Yes	No	No	No	Yes
Add-On Network I/O Cards	Yes	Yes	Yes	No	Yes
Add-On Mass Storage I/O Cards	Yes	No	No	No	No

Offline Support Tool Availability

Updates to the EFI HP service partition (HPSP) are available through the CD Installer option on the IPF Offline Diagnostics and Utilities CD. At a minimum, an ISO image of the IPF Offline Diagnostics and Utilities CD is available from the HP web.

Offline Support Tools List

Table 24 details the offline support tools available for the server blade.

Table 24 Offline Support Tools List

Offline Tool	Functional Area
CPUDIAG	Processor Diagnostic
MEMDIAG	Memory Diagnostic
MAPPER	System Mapping Utility
PLUTODIAG	SBA/LBA Chipset
PERFVER	Peripheral Verifier
DFDUTIL	SAS Disk Firmware Update Utility
DISKUTIL	Disk Test Utility (Non-Destructive)
COPYUTIL	Data Copy Utility
DISKEXPT	Disk Expert Utility
IODIAG	I/O Diagnostics Launch Facility (Runs third party diagnostics and runs BITS, if available)

Table 24 Offline Support Tools List *(continued)*

Offline Tool	Functional Area
CIODIAG2	Core I/O Diagnostic
Specific Card I/O Diagnostics	Card-Specific I/O Diagnostics/BIST

General Diagnostic Tools

Table 25 details the general diagnostic tools available for most HP Integrity server platforms. The distribution method is through the web.

Table 25 General Diagnostic Tools List

Diagnostic Tool	Description
IPMI Event Decoder	Provides detailed information about the IPMI event (Problem description, cause, action)

Fault Management Overview

The goal of fault management and monitoring is to increase server blade availability, by moving from a reactive fault detection, diagnosis, and repair strategy to a proactive fault detection, diagnosis, and repair strategy. The objectives are:

- To detect problems automatically, as close as possible to the time of occurrence.
- To diagnose problems automatically, at the time of detection.
- To automatically report (in understandable text) a description of the problem, the likely cause(s) of the problem, the recommended action(s) to resolve the problem, and detailed information about the problem.
- To ensure that tools are available to repair or recover from the fault.

HP-UX Fault Management

Proactive fault prediction and notification is provided on HP-UX by SysFaultMgmt WBEM indication providers, as well as by the Event Management Service (EMS). The Event Management Service and WBEM provide frameworks for monitoring and reporting events.

SysFaultMgmt WBEM indication providers and the EMS Hardware Monitors allow users to monitor the operation of a wide variety of hardware products, and alert them immediately if any failure or other unusual event occurs. By using hardware event monitoring, users can virtually eliminate undetected hardware failures that could interrupt server blade operation or cause data loss.

Complete information on installing and using EMS hardware event monitors, as well as a list of supported hardware, can be found in the *EMS Hardware Monitors Users Guide*. An electronic copy of this book is provided on the HP website at http://www.hp.com/go/hpux-diagnostics-docs.

WBEM indication providers and EMS Hardware Monitors

Hardware monitors are available to monitor the following components (these monitors are distributed free on the OE media):

- Chassis/Fans/Environment
- CPU monitor
- UPS monitor
- FC Hub monitor
- FC Switch monitor
- Memory monitor
- Core Electronics Components
- Disk drives
- Ha_disk_array

Errors and Error Logs

Event Log Definitions

Often the underlying root cause of an MCA event is captured by server blade or BMC firmware in both the System Event Log (SEL) and Forward Progress Event Logs (FP). These errors are easily matched with MCA events by their timestamps. For example, the loss of a processor VRM might cause a processor fault. Decoding the MCA error logs would only identify the failed processor as the most likely faulty FRU. Following are some important points to remember about events and event logs:

- Event logs are the equivalent of the old chassis logs for status or error information output.
- Symbolic names are used in the source code; for example, **`MC_CACHE_CHECK`**.
- The hex code for each event log is 128 bits long with an architected format:
  - Some enumerated fields can be mapped to defined text strings.
  - All can be displayed in hex, keyword, or text mode.
- Events are created by firmware or OS code, and are sent over the PDH bus to the BMC for storage in either or both of the SEL and FP logs (HP-UX shows an I/O path for the BMC).
- The iLO 2 MP displays event logs: SEL events are sent over the IPMB, between the BMC and the MP.
- Event logs are read back over the PDH bus by software (i.e., the IPMI driver or agent) for storage on disk.

Event Log Usage

To consult the event logs:

1. Connect to the system console.
2. Enter **Ctrl-B** to access the MP Main Menu.
3. Enter the `sl` command to view event logs: System Event (**E**) and Forward Progress (**F**) logs are useful to determine the context of an error.

NOTE: The SEL `E` shows only event logs with alert level 2 or higher. The SEL defaults to alert level 2 on the server blade because there are some level 2 events related to rack infrastructure change. The alert level can be changed. The SEL is never overwritten unless first manually cleared. It does get full.

The Forward Progress Log (**F**) shows all event log outputs. The FPL log is circular. It wraps, automatically replacing the oldest events with the newest. It never get full. Oldest logs get overwritten first.

iLO 2 MP Event Logs

The iLO 2 MP provides diagnostic and configuration capabilities. For details on the iLO 2 MP commands, see the *HP Integrity iLO 2 Operations Guide*. To access the MP:

NOTE: The iLO 2 MP must be accessed from a terminal console which has access to the MP.

1. Log in with the proper username and password.

   NOTE: Default operator login and password:

   login = **`Oper`**

   password = **`Oper`**.

   You are now at the MP Main Menu.
2. Enter **`cl`** to display the console history log. This log displays console history from oldest to newest.
3. Enter **Ctrl-B** to return to the MP Main Menu.
4. Enter **`sl`** to display the status logs. The status logs consist of:
   - System Event
   - Forward Progress
   - Current Boot
   - Previous Boot
   - Live Events
   - Clear SEL/FPL Logs
5. Enter **Ctrl-B** to return to the MP Main Menu.

System Event Log Review

To access the System Event Log (SEL):

1. Access the iLO 2 MP command prompt.
2. Run the `sl` command. The Event Log Viewer menu displays:

```
SL
Event Log Viewer:
Log Name            Entries    % Full         Latest Entry
-------------------------------------------------------------------
E - System Event            9         1 %      29 Oct 2002 19:15:05
F - Forward Progress      129         3 %
B - Current Boot           82
P - Previous Boot           0
L - Live Events
C - Clear All Logs
Enter your choice or [Q] to Quit:
```

3. Select **`E`** to review the system events. The Event Log Navigation menu displays:

```
Enter menu item or [Ctrl-B] to Quit: e
    Log Name            Entries    % Full      Latest Timestamped Entry
-------------------------------------------------------------------------
E - System Event           12         1 %      31 Oct 2003 23:37:45
Event Log Navigation Help:
   +       View next block     (forward in time,  e.g. from 3 to 4)
   -       View previous block (backward in time, e.g. from 3 to 2)
   <CR>    Continue to the next or previous block
   D       Dump the entire log
   F       First entry
   L       Last entry
   J       Jump to entry number
   H       View mode configuration - Hex
   K       View mode configuration - Keyword
   T       View mode configuration - Text
   A       Alert Level Filter options
   U       Alert Level Unfiltered
   ?       Display this Help menu
   Q       Quit and return to the Event Log Viewer Menu

   Ctrl-B  Exit command, and return to the MP Main MenuMP:SL (+,-,<CR>
   ,D, F, L, J, H, K, T, A, U, ? for Help, Q or Ctrl-B to Quit) >a

Alert Level Threshold Filter:
   1  : Major Forward Progress
   2  : Informational
   3  : Warning
   5  : Critical
   7  : Fatal

Enter alert level threshold or [Q] to quit filter setup: 3

   -> Alert threshold level 3 filter will be applied.
      Set up alert filter options on this buffer? (Y/[N])

       Log Name            Entries    % Full         Latest Entry
-----------------------------------------------------------------
    E - System Event          410        47 %      18 Feb 2003 09:38:10
Event Log Navigation Help:
   +       View next block     (forward in time,  e.g. from 3 to 4)
   -       View previous block (backward in time, e.g. from 3 to 2)
   <CR>    Continue to the next or previous block
   D       Dump the entire log for capture and analysis
   F       First entry
   L       Last entry
   J       Jump to entry number
   V       View mode configuration (text, keyword, hex)
   ?       Display this Help menu
   Ctrl-B  Quit and return to the Main Menu
```

4. Select **a**, then a threshold filter number to filter events to desired level.

```
MP:SL (+,-,<CR>,D, F, L, J, H, K, T, A, U, ? for Help, Q or Ctrl-B to Quit) >a
Alert Level Threshold Filter:
   1  : Major Forward Progress
   2  : Informational
   3  : Warning
   5  : Critical
   7  : Fatal
Enter alert level threshold or [Q] to quit filter setup: 3
   -> Alert threshold level 3 filter will be applied.
```

5. Select **v**, then **t** to change the display to text mode:

```
Display Mode Configuration:
               H - Hex mode
   Current -> K - Keyword mode
               T - Text mode
Enter new value, or [Q] to Quit:
```

6. To decode the blinking state of server LED, review the entire SEL and look at events with alert level 2 and above.

   For example:

```
Log Entry 24: 14 Feb 2003 15:27:02
Alert Level 3: Warning
Keyword: Type-02 1b0800 1771520
Hot Swap Cage: SCSI cable removed
Logged by: BMC;  Sensor: Cable / Interconnect - SCSI ChExt Cable
Data1: Device Removed/Device Absent
0x203E4D0AC6020220 FFFF0008F61B0300

Log Entry 73: 00:00:12
Alert Level 3: Warning
Keyword: Type-02 050301 328449
The server's built-in sensors have detected an open chassis door.
Logged by: BMC;  Sensor: Physical Security - Chassis Open
Data1: State Asserted
0x200000000C020570 FFFF010302050300
```

Supported Configurations

This subsection provides examples of how to use the iLO 2 MP to acquire configuration information for troubleshooting purposes. It also provides a system build-up procedure.

For a list of all FRUs in the server blade, with their corresponding part numbers, see Appendix A (page 146).

System Build-Up Troubleshooting Procedure

Use this procedure only when the server powers on and remains powered on but does not enter into or pass POST, or does not boot to EFI menu.

1. Remove the access panel to gain access to internal FRUs. See "Removing the Server Blade Access Panel" (page 112).
2. Remove all of the HDDs from the front of the chassis. See "Removing a SAS Disk Drive" (page 108).
3. Remove the memory DIMMs. See "Removing a DIMM" (page 114).
4. Remove the processors. See "Removing a Processor" (page 116).
5. Replace the server blade in the enclosure. The server blade (and MP) powers on.
6. Enter the **DF** command from the MP Console Menu. The following displays:

```
CM> DF

Display FRU Information Menu:
     S - Specific FRU
     A - All available FRUs
     V - Display Mode: Text
```

7. Enter **S** to show the FRU IDs. The following displays:

```
FRU IDs:
--------
0001-Comm Module        0002-Disk Backplane
0003-Mezzanine Board    0000-Motherboard
```

   If you do not see all of the above FRU IDs, then concentrate on the missing FRU ID(s). The following alert (IPMI) event displays for this action, as read from the SEL:

```
Log Entry 4: Dec 2005 00:00:09
Alert Level 7: Fatal
Keyword: Type-02 257100 2453760
Missing FRU device - DIMM0A
Logged by: Baseboard Management Controller,
```

```
Sensor: Entity Presence
0x2000000009020050 FF01807115250300
```

If you do not get the above Alert Level 7 (IPMI) event, but get another high level alert, replace the server blade.

8. Add at least one rank of memory DIMMs.
9. Enter the **DF** command. The following displays:

```
Display FRU Information Menu:
     S - Specific FRU
     A - All available FRUs
     V - Display Mode: Text
```

10. Enter **S** to show the FRU IDs. The following displays (one rank of DIMMs installed):

```
FRU IDs:
--------
0001-Comm Module    0002-Disk Backplane   0003- Mezzanine Board
0128-DIMM0A         0129-DIMM0B           0000-Motherboard
```

If you do not see all of the above FRU IDs then concentrate on the missing FRU ID(s). The following alert (IPMI) event displays for this action, as read from the SEL:

```
Log Entry 3: Dec 2005 21:50:43
Alert Level 7: Fatal
Keyword: Type-02 257100 2453760
Missing FRU device - Processor 0
Logged by: Baseboard Management Controller,
Sensor: Entity Presence
0x2041CB3DB3020040 FF2080711525030
```

If you do show the Alert level 7 “Missing FRU device - Processor 0”, continue to the next step.

11. Insert a processor into processor slot 0. When you add the processor and turn on server power, the cooling fans should turn on and stay on, and the `DF` and `S` command output should look something like this:

```
FRU IDs:
--------
0032-Processor 0      0036-Processor 0 RAM     0001-Comm Module
0002-Disk Backplane   0003- Mezzanine Board    0128-DIMM0A
0129-DIMM0B           0000-Motherboard
```

If the installed FRUs are all functional, the server should initiate POST on all processors. Observe the system console output through “Live Events” to ensure that POST initiates and completes without error.

If POST does not start after a few seconds, suspect some sort of system board or processor problem. Typical problems show up in the SEL or FWP. If the IPMI event logs do not point to a root cause, escalate to bring in expert assistance.

Troubleshooting Processors/Memory/SBA

All of the processor, memory controller, DIMMs, and SBA (I/O rope controller) functions reside on the server blade FRU. This section discusses the roles of physical processors and physical memory ranks.

Troubleshooting Processors

Each server blade supports 1 or 2 Intel processors. The Intel dual-core processors have two logical processors per physical processor. This means you can have four processor cores when two physical processors are installed into a server blade.

Each physical processor core contains logic to support two physical threads. The operating system kernel attaches one or more software processes to each available thread, so in multiple processor server blades, having more threads means all software processes are launched and issued more rapidly.

Processor Installation Order

For a minimally loaded server blade, one IPF processor module must be installed in processor slot 0. Slot 0 is the slot closer to the server blade chassis. Install a processor of the same version into processor slot 1 (if purchased).

Processor Module Behaviors

All physical processors become functional after server power is applied. Each processor is in a race to fetch their instructions from their processor instruction and data caches to complete early self test and rendezvous.

It is the processor cache controller logic that issues cache line fetches from PDH/physical shared memory, when a requested cache line is not within its instruction or data cache. Cache line fetches are transferred over the McKinley bus, between processors and PDH/physical shared memory.

Local machine check abort (MCA) events cause one IPF processor module to fail, while the other IPF processor module continues operating. Double-bit data cache errors in any physical processor core causes a Global MCA event, that causes all IPF processor modules to fail and reboot the operating system.

Customer Messaging Policy

No diagnostic messages are reported for single-bit errors, that are corrected in both instruction and data caches, during corrected machine check (CMC) events to any physical processor core. Diagnostic messages are reported for CMC events, when thresholds are exceeded for single-bit errors; fatal processor errors cause global/local MCA events.

Troubleshooting Blade Memory

The memory controller logic in the zx1 chip supports two physical ranks, that hold 2 memory DIMMs each.

Memory DIMMs installed in groups of two are known as a pair, and must be the same size and configuration.

Memory DIMM Installation Order

For a minimally loaded server, two equal-size memory DIMMs must be installed into rank 0 slots 0A and 0B. The next two DIMMs are loaded into rank 1 slots 1A and 1B, and so forth.

Memory Subsystem Behaviors

All server blades with zx1 chips provide error detection and correction of all memory DIMM single-bit errors, and error detection of most multibit errors within a 128 byte cache line.

The zx1 chip provides memory DIMM error correction for up to 4 bytes of a 128 byte cache line, during cache line misses initiated by processor cache controllers, and by Direct Memory Access (DMA) operations, initiated by I/O devices. This feature is called chip sparing, as 1 of 72 total DRAMs in any memory pair can fail without any loss of server blade performance.

Customer Messaging Policy

PDT logs for all double bit errors are permanent; single bit errors are initially logged as transient errors. If the server logs 2 single bit errors within 24 hours, it upgrades them to permanent status in the PDT.

Troubleshooting Blade SBA

Each server blade's system bus adapter (SBA) supports core I/O, SAS, LAN, and FibreChannel functions. The System Bus Adapter (SBA) logic within the zx1 chip of a server blade uses 6 of 8

ropes to support 4 Lower Bus Adapter (LBA) chips. Each LBA chip interfaces with the SBA in the zx1 chip, through one or multiple rope connections, as follows:

- One LBA chip uses a single rope connection (used by core I/O) to support a single 32-bit PCI bus running at 33 MHz;
- One LBA chip use a single-rope connection (used by controller) to support one 64-bit PCI-X bus running at 66 MHz;
- Two LBA chips use a dual rope connection (used by LAN and FibreChannel controllers) to support individual 64-bit PCI-X buses running at 133 MHz;

Enclosure Information

This installation document covers only the HP Integrity BL860c server blade, and does not include any specific server blade enclosure information. For server blade enclosure information, go to the HP website at: http://h71028.www7.hp.com/enterprise/cache/316735-0-0-0-121.html

Cooling Subsystem

The server blade does not contain any fans. Cooling is handled by the enclosure.

Troubleshooting Communications Modules

This subsection provides information on troubleshooting issues with the internal PCI-X buses.

I/O Subsystem Behaviors

The main role of the I/O subsystem is to transfer blocks of data and instruction words between physical shared memory and virtual memory (server disks/disk array). The server boot is the first time blocks of data and instructions words are transferred into physical shared memory from a local disk/DVD, or from a remote disk on another server through multiple LAN transfers. This process is referred to as Direct Memory Access (DMA), and is initiated by I/O devices located in core I/O or on I/O device controllers, and does not involve any processors.

A secondary function of the I/O subsystem is to transfer four bytes of data between the internal registers within each processor core, and the internal control and store registers in the zx1/PDH /Local Bus Adapters (LBAs), and device controller chips. This process is called programmed I/O, and is initiated by any processor executing external LOAD/STORE instructions.

NOTE: System firmware and the HP-UX kernel both use the programmed I/O method to initiate direct memory access (DMA) transfers.

Customer Messaging Policy

- Always point the customer to the SEL for any action from low level I/O subsystem faults. IPMI events in SEL/FPL provide the logical ACPI path of the suspect I/O subsystem FRU. Use Table 26 to determine the physical device controller.
- Some diagnostic messages are reported for high level I/O subsystem errors; all fatal I/O subsystem errors cause global MCAs. (Note that HP-UX provides its own path with the physical rope number of the suspect I/O subsystem FRU. Use Table 26 to determine the physical device controller.)

Table 26 Rope-to-ACPI Paths

PCI Bus	Physical Rope #	Logical ACPI Path
Slow core iLO 2 MP @ 33MHz	0	Acpi(HWP0002,PNP0A00,0)/Pci(1 | 0) Acpi(HWP0002,PNP0A03,0)/Pci(1 | 1)

Table 26 Rope-to-ACPI Paths *(continued)*

PCI Bus	Physical Rope #	Logical ACPI Path
		Acpi(HWP0002,PNP0A03,0)/Pci(1 | 2)
Fast core @ 66 MHz	1	Acpi(HWP0002,PNP0A00,400)/Pci(1 | 0)
Dual FibreChannel @ 133 MHz	2, 3	Acpi(HWP0002,PNP0A03,400)/Pci(2 | 0) Acpi(HWP0002,PNP0A03,400)/Pci(2 | 1)
Pair of dual LAN @ 133 MHz	4, 5	Acpi(HWP0002,PNP0A03,500)/Pci(0 | 0)

Troubleshooting Management Subsystem

Both the iLO 2 MP and the BMC are integrated components (not FRUs) on the server blade. There are no external or internal LEDs to view or monitor their operational states.

The server blade front panel LEDs are turned on or off by the BMC, then the system console; subsequent access to iLO 2 MP commands and menus is controlled by the MP.

Firmware

The server blade has two sets of firmware installed:

- Server blade and BMC firmware
- iLO 2 MP firmware

When upgrading server blade and BMC firmware, you must upgrade both components on the server blade from the same release. Details about a specific release are available in the associated Release Notes.

Firmware updates are available from http://www.hp.com under Support and Drivers.

Identifying and Troubleshooting Firmware Problems

Erratic server blade operation, or the fact that the server blade may not boot successfully to the EFI Boot Manager or to the EFI Shell, are symptoms of possible firmware problems.

NOTE: Firmware problems are relatively rare. Look for other problem causes first.

Probable firmware failure areas are:

- Unsupported firmware installation
- Corrupt firmware installation

To troubleshoot firmware problems:

1. Verify that all server blade and BMC firmware components are from the same release (use the MP `sr` command).
2. Reinstall server blade and BMC firmware.

Firmware Updates

Your server blade has an EFI utility for updating the server blade and BMC firmware, and the iLO 2 MP firmware. This utility is `fweupdate.efi`

To update your firmware:

1. Start up the server blade and get to the EFI command prompt.
2. To determine the current firmware version, issue the EFI `Shell> info fw` command at the EFI Shell prompt.
3. Look for the latest firmware updates at http://www.hp.com/bizsupport. If a new version of the firmware is available, then download it and save it to CD, or copy it over the network to the server blade you are going to update.

4. On the server blade you are updating, issue the `fweupdate.efi` command from the EFI command prompt by entering: **`fweupdate.BL860c.sxxxx.byyyy.mzzzz.efi`**.

   where:

   `s` means system firmware; **`xxxx`** is the system firmware version number

   `b` means BMC firmware; **`yyyy`** is the BMC firmware version number

   `m` means iLO 2 MP firmware; **`zzzz`** is the iLO 2 MP firmware version number

   This command updates the system firmware, BMC firmware, and iLO 2 MP firmware.

Troubleshooting the Server Interface (System Console)

All system console connections (local RS-232 and iLO 2 MP LAN) are made through the I/O port connector on the front of the server blade, through the local I/O cable.

HP-UX uses the RS-232 serial text connection to a dumb terminal, or to terminal emulator software running on a PC, to control server blade operations locally. All other connections are unsupported.

HP-UX alternatively uses the MP's 10/100 BT LAN connection over a private network, to control one or more server blade operations – locally through telnet or Secure Shell (SSH), or remotely over a public network through a web GUI.

NOTE: RS-232 connection: If a dumb terminal/PC running terminal emulation software is attached to the iLO 2 MP local port and does not respond to a **Ctrl-B** key sequence (and the terminal is running 9600 baud, 8 data bits, is online, etc.) then it is possible that the iLO 2 MP is not operational/functional.

Troubleshooting the Environment

Ambient intake air temperature is often different from ambient room temperature; measure the operating temperature and humidity directly in front of the cabinet cooling air intakes, rather than measure only ambient room conditions.

Within the server blade enclosure, temperature sensors report chassis temperature to the BMC. The BMC controls fan speed, based on this information.

Temperature sensors are found on:

- I/O baseboard, where the processors provide an integrated temperature sensor
- Status panel, where a thermal sensor detects the ambient room temperature. This sensor's reading is the main parameter used to regulate fan speed, under normal conditions.

Table 27 provides environmental specifications for server blades:

Table 27 Blade Server Environmental Specifications

Parameter	Operating Range	Recommended Operating Range	Maximum Rate of Change	Non-Operating Range
Temperature	5-35 degrees C (up to 5000 feet)	20-25 degrees C (up to 5000 feet)	10 degrees C/hr with tape; 20 degrees C/hr without tape	-40 degrees to +60 degrees C
Relative Humidity	15-80% at 35 degrees C noncondensing	40-60% at 35 degrees C noncondensing	30% per hour noncondensing	90% at 65 degrees C noncondensing

Reporting Your Problems to HP

HP customer care will help you solve server blade problems and, if necessary, initiate appropriate service procedures. Support is available on the web and by phone.

For information on contacting the HP Support Center (HPSC) near you, go to: http://www.hp.com/go/hpsc.

Online Support

To contact HP Customer Support online, see the Worldwide Limited Warranty and Technical Support Guide or visit us at http://www.hp.com/bizsupport. On our web page, enter the server blade model number (for example, "BL860c") and search the field.

The following information is available on this website:

- Software and firmware updates
- The latest drivers and utilities
- Additional documentation

Phone Support

To contact HP customer support by phone, go to the HP Support Center (HPSC) near you, at: http://www.hp.com/go/hpsc. Local phone numbers are listed in your native language for help.

Information to Collect Before you Contact Support

NOTE: It is highly recommended that you keep detailed records of any changes to your server blade(s), and of how server blade behavior has changed over time, or as a result of changes made to your server blade(s).

Before you contact HP support, you should:

1. Use this chapter (Chapter 5: "Troubleshooting") to solve the problem.
   - Note failure symptoms and error indications (LEDs and messages).
   - Capture and permanently log the current SEL and FPL contents.
   - Try to determine precisely what did or did not happen.
2. Collect the following information:
   - The model number of your server blade (for example, "BL860c").
   - The product number of your server blade. This can be found on the identification label, which is found at the front of the unit. (Typically, of the form "AD000A")
   - The serial number of your server blade. This can be found on the identification label.
3. Be familiar with your server blade configuration.
   - Are you using the LAN, RS-232, or web interface to monitor the server blade(s)?
   - How many processors and DIMMs were installed?
   - What versions of processor and memory are used and where are they installed?
   - What accessories are installed?
4. Determine the following
   - Which firmware versions are in use?
   - When did the problem start?
   - Have recent changes been made to the server blade(s)?
   - Which version of HP-UX is in use?

6 Removing and Replacing Components

This chapter provides information on removing and replacing components in the server blade.

Service Tools Required

Service of this product may require the following tools:

- The CPU Install Tool Kit, consisting of:
  - Disposable ESD Kit
  - Labelless CPU install tool (2.5mm hex and Torx 15)
- 1/4-inch flat blade screwdriver
- Torx T-15 Torx screwdriver

None of the internal components are hot-swappable because they are not accessible unless the server blade is removed from the server blade enclosure.

Removing and Replacing a Hot-Plug SAS Disk Drive

The only hot-plug devices in the server blade are the SAS disk drives.

To assess hard drive status, observe the SAS disk drive status LEDs. For an explanation of these LEDs, see "SAS Disk Drive LEDs" (page 93).

IMPORTANT: Before removing a SAS disk drive, perform a complete data backup.

If disk drive mirroring is enabled, it is not necessary to power down the server blade before removing or replacing a SAS disk drive. If mirroring is not enabled, perform a graceful OS shutdown before removing a disk drive to protect data.

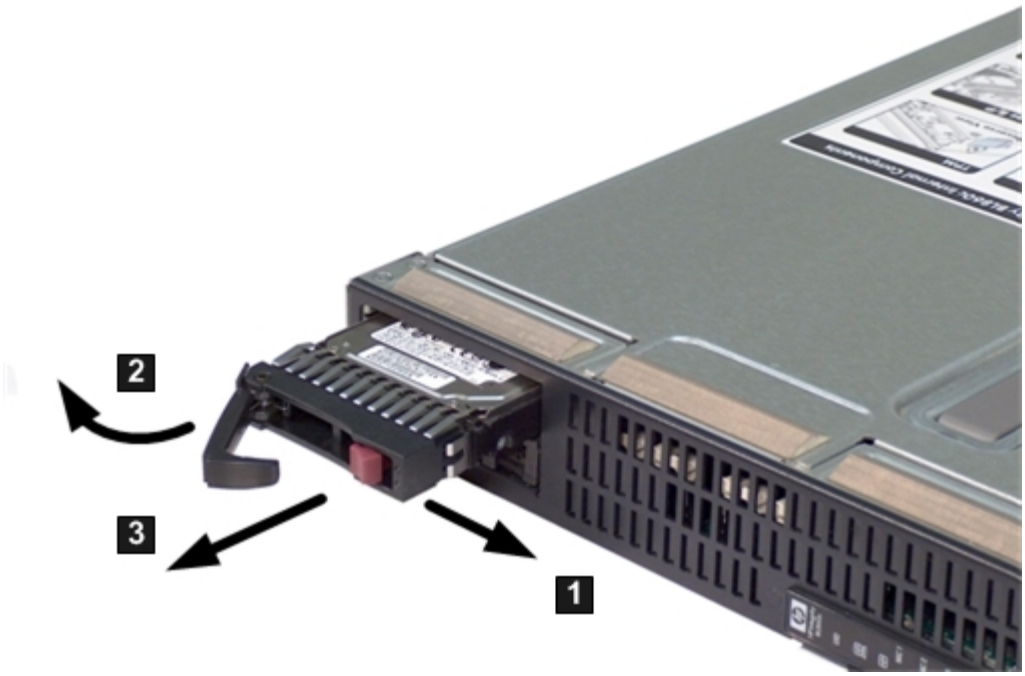
You are not required to remove the server blade from the enclosure to remove and replace a SAS disk drive.

Removing a SAS Disk Drive

To remove a SAS disk drive:

1. Press the Release button (1). See Figure 35.
2. Open the ejector lever (2).
3. Slide the SAS disk drive out of the drive cage (3).

Figure 35 Removing a SAS Disk Drive



CAUTION: Always populate hard drive bays with a SAS disk drive or a hard drive blank. Operating the server blade without a SAS disk drive or disk drive blank causes improper airflow and cooling, which can lead to thermal damage.

Replacing a SAS Disk Drive

To replace a SAS disk drive:

1. Slide the drive into the cage until it is fully seated.
2. Close the lever to lock the drive into place.

Removing and Replacing Disk Drive Blanks

The server blade has two disk drive bays. If you only purchased one hard disk, your server blade has a hard drive blank installed. Hard drive blanks maintain proper airflow throughout the server blade.

CAUTION: Always populate hard drive bays with a SAS disk drive or a disk drive blank. Operating the server blade without a SAS disk drive or disk drive blank causes improper airflow and cooling , which can lead to thermal damage.

Removing a Disk Drive Blank

To remove a disk drive blank:

1. Press the Release buttons simultaneously. See Figure 36.
2. Pull the blank out of the disk drive bay.

Figure 36 Removing a Disk Drive Blank

Replacing a Disk Drive Blank

To replace the hard drive blank, slide the blank into the bay until it locks into place. The hard drive blank is keyed to fit only one way.

Preparing the Server Blade for Servicing

To service an internal server blade component, power down the server blade and remove it from the server blade enclosure.

CAUTION: Electrostatic discharge can damage electronic components. Ensure you are properly grounded before beginning an installation procedure. For more information, see the "Safety Information" (page 26).

Powering Off the Server Blade

The front panel power switch, or the Virtual Power Button, do not completely shut the power off in the server blade. This toggles between on and standby modes, rather than on and off. The standby position removes power from most components and drives, but portions of the power supply and some internal circuitry remain active.

WARNING! Before proceeding with maintenance or service on a server blade that requires physical contact with electrical or electronic components, ensure that power is removed or safety precautions are followed to prevent electric shock and equipment damage. Observe all WARNING and CAUTION labels on equipment.

To service internal server blade components:

1. Identify the proper server blade in the server blade enclosure.

   The enclosure slots are numbered Bay 1 one through Bay 16 from left to right.
2. Remove power from the server blade in one of the following ways:
   - Use the iLO Virtual Power Button on the Remote Console to power off the server blade from a remote location. It can take up to 30 seconds for the server blade enter standby mode. Wait for the power LED to change from green to amber before proceeding.
   - Press the Power button on the front of the server blade. It can take up to 30 seconds for the server blade to reach standby. Wait for the power LED to change from green to amber before proceeding.

Removing and Replacing the Server Blade from the Enclosure

The following procedures describe how to remove and replace the server blade from the enclosure.

Removing the Server Blade From the Enclosure

To remove the server blade from the enclosure:

1. Press the Release button on the server blade (1). See Figure 37.

CAUTION: After you press the Release button, the server blade is unlocked from the enclosure. Use both hands to support the server blade when you remove it from the rack. The server blade weighs approximately 9 kg (20 lb).

The enclosure fans might still be running when the server blade is in standby mode. Opening the lever removes all power from the server blade.

2. Open the lever (2).
3. Grasp the lever and slide the server blade out of the enclosure (3). Place your hand under the server blade to support it while removing it from the enclosure.

Figure 37 Removing the Server Blade from the Enclosure

4. Place the server blade on a flat, level, antistatic surface.

CAUTION: Always populate server blade enclosure bays with a server blade or server blade blank. Operating the enclosure without a server blade or server blade blank causes improper airflow and cooling, which can lead to thermal damage.

Replacing the Server Blade in the Enclosure

To replace the server blade into the enclosure:

1. Slide the server blade back into the enclosure until flush with the enclosure.
2. Close the lever.

NOTE: After you install the server blade back into the enclosure, the server blade might go to standby power (Internal health LED is amber), or full power (internal health LED is green, and the fans may get louder).

3. If the server blade does not come up to full power, push the Power button to get the server to full power.

   The fans might get louder as the server powers up to full power.

Removing and Replacing the Server Blade Access Panel

The access panel is located on the right side of the server blade (when mounted in an enclosure).

Removing the Server Blade Access Panel

To remove the access panel:

1. Power off the server blade and remove it from the server blade enclosure.

   See "Preparing the Server Blade for Servicing" (page 110).
2. Unlock the cam on the access panel latch (if necessary) by turning the lock on the latch counterclockwise with a 2.5 mm allen wrench.
3. Pull up on the access panel latch (1).

   This causes the access panel to slide back about 1.75 cm (0.75 in).Figure 38.
4. Remove the access panel by lifting it straight up and off the server blade (2).

Figure 38 Removing the Server Blade Access Panel

Replacing the Server Blade Access Panel

To replace the access panel:

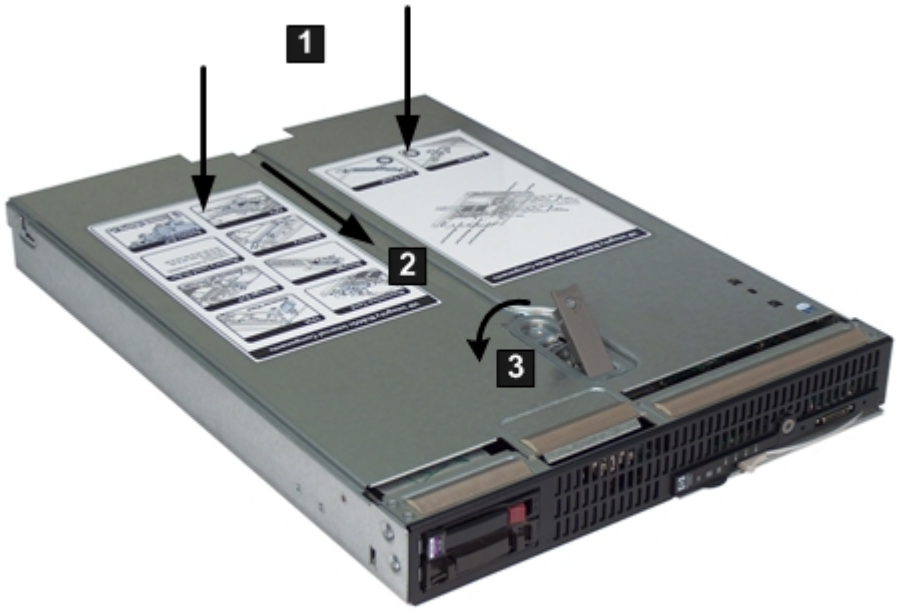
1. Ensure the access panel latch is in the open position (pointing up) before replacing the access cover.

   See Figure 39 (page 113).
2. Place the access panel on the blade with the panel hanging over the back of the enclosure about 1.25 cm (0.5 in).(1).

   See Figure 39.
3. Slide the access panel toward the front of the server until the access panel clicks into place (2).
4. Close the access panel latch (3).
5. lock the cam on the access panel latch (if necessary) by turning the lock on the latch clockwise with a 2.5 mm allen wrench.
6. Place the server blade back into the enclosure and power it on.

   See "Preparing the Server Blade for Servicing" (page 110).

Figure 39 Replacing the Server Blade Access Panel



Removing and Replacing Internal Components

These procedures describe how to remove and replace the internal components in the server blade. The server blade contains the following field replaceable units (FRUs).

NOTE: All FRUs are also customer replaceable units (CRUs) except the TPM. The TPM **must** be serviced by authorized HP personnel only.

- DIMMs
- Processors
- SAS backplane
- Front display board
- Mezzanine cards

- TPM module
- System board

NOTE: The server blade must be removed from the enclosure to access the internal components; therefore, no internal devices are hot-swappable or hot-pluggable in the server blade.

Removing and Replacing DIMMs

There are 12 DIMM slots located on the system board. The following procedures describe how to remove and replace memory DIMMs in the server blade.

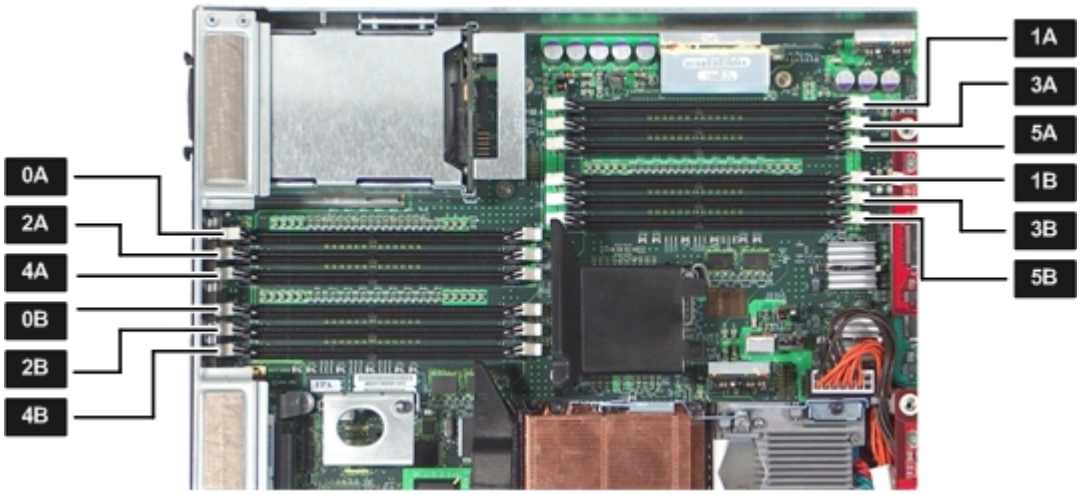
Removing a DIMM

To remove a failed DIMM from the server blade:

1. Power off the server blade and remove it from the server blade enclosure.
   See "Preparing the Server Blade for Servicing" (page 110).
2. Remove the access panel.
   See "Removing the Server Blade Access Panel" (page 112).

   NOTE: The server blade ships with at least two DIMMs installed in slots 0A and 0B.
3. Locate the DIMM slots on the server blade system board.
   See Figure 40.

Figure 40 DIMM Slot Locations



4. Open the DIMM slot latches for the DIMM you are removing.
5. Remove the DIMM from the slot.

IMPORTANT: DIMMs **must** be installed in identical pairs.
DIMMs do not seat fully if turned the wrong way.

DIMM Installation Order

The DIMM installation order is as follows:

1. Slots DIMM 0A and DIMM 0B
2. Slots DIMM 1A and DIMM 1B
3. Slots DIMM 2A and DIMM 2B
4. Slots DIMM 3A and DIMM 3B

5. Slots DIMM 4A and DIMM 4B
6. Slots DIMM 5A and DIMM 5B

The server blade uses a minimum of 1 GB of memory (two 512-MB DIMMs), and a maximum of 96 GB of memory (twelve 8-GB DIMMs). If you purchased additional memory, use these procedures to install more memory into your server blade.

Load DIMMs from highest capacity to lowest capacity (for example, load the 8-GB DIMMs first, then the 4-GB DIMMs, then the 2-GB DIMMs, and so forth).

The memory subsystem supports chip spare functionality. The DIMMs in a pair must be identical to enable chip sparing. Chip sparing enables an entire SDRAM chip on a DIMM to be bypassed (logically replaced) if a multibit error is detected on that SDRAM.

To use the chip spare functionality, use only DIMMs built with the same HP part numbers. These DIMMs **must** be loaded in pairs.

DIMM Configuration

The memory subsystem supports only DDR SDRAM technology using industry-standard PC2-4200 type DDR SDRAM DIMMs, 1.2 inches tall, using a 184-pin JEDEC standard connector. In the server blade, you must load the DIMMs in pairs. To enable chip sparing, you must use two DIMMs of the same capacity and configuration. Table 28 summarizes the server blade memory configurations.

Table 28 Server Blade Memory Array Capacities

Min / Max Memory Size	Single DIMM Sizes
1 GB / 2 GB	512 MB
2 GB / 4 GB	1 GB
4 GB / 8 GB	2 GB
8 GB / 48 GB	4 GB

Loading DIMMs as pairs (two identical DIMMs) enables lock-step mode and chip sparing.

Replacing a DIMM

To replace a DIMM:

1. Ensure the DIMM slot latches are open.

△ **CAUTION:** Use only HP low-profile (1.2 in.) DIMMs. DIMMs from other sources may adversely affect data integrity.

2. Insert the DIMM into the slot and push down until the latches click shut.
3. Replace the access panel.

   For details, see the "Replacing the Server Blade Access Panel" (page 112).
4. Place the server blade into the enclosure.

   See "Replacing the Server Blade in the Enclosure" (page 111).

Removing and Replacing a Processor

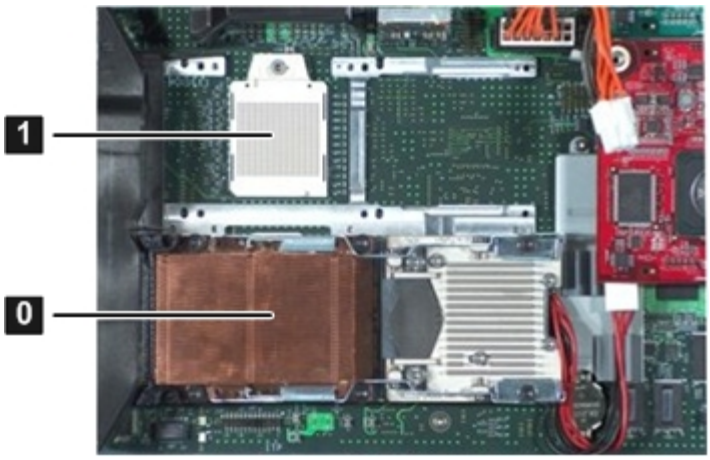
The following procedures describe how to remove and replace a processor in the server blade.

Install the processors into the server blade in the following order:

- Processor slot 0
- Processor slot 1

For the processor slot locations, see Figure 41 (page 116).

Figure 41 Processor Slot Locations on the System Board



Removing a Processor

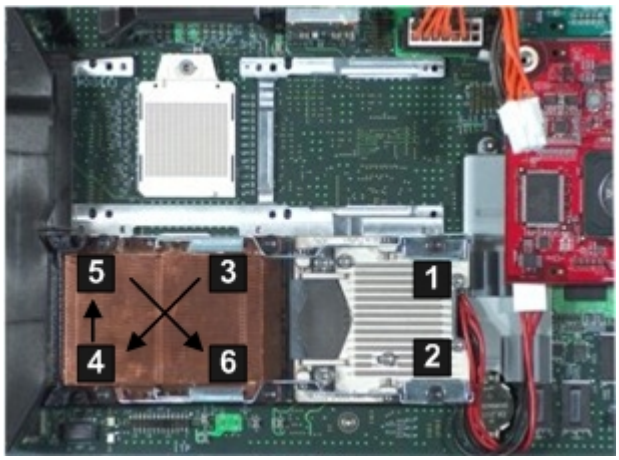
To remove a processor:

Removing processor 0 is shown in this procedure.

If you are only adding a processor, remove the dust cover from the processor socket, and proceed to "Installing a Processor" (page 117).

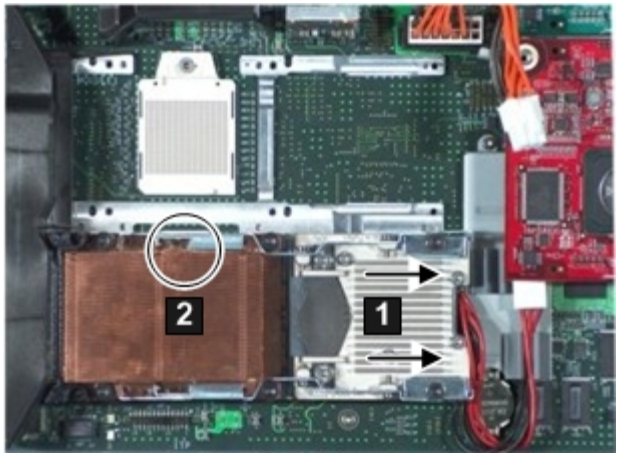
1. Power off the server, and remove it from the enclosure.
   See "Preparing the Server Blade for Servicing" (page 110).
2. Remove the access panel.
   See "Removing the Server Blade Access Panel" (page 112).
3. Disconnect the power cable from the processor you are removing.
4. Loosen the captive screws (1 - 2) on the processor with the Torx T-15 screwdriver.
   See Figure 42 (page 116).

Figure 42 Removing the Processor Module on the Server Blade Board



5. Loosen the captive shoulder screws (3 - 6) on the processor heat sink in the order shown in Figure 42 with the Torx T-15 screwdriver.
6. Slide the processor sequencer to the right, and hold it in place to uncover the ZIF socket (1).
7. Unlock the ZIF socket by turning the socket 180 degrees counter clockwise (2).
   See Figure 43.

Figure 43 ZIF Socket on the Processor



8. Carefully remove the processor module by lifting it straight up from the system board.
9. Place the processor module in an antistatic bag.

Installing a Processor

To install the processor:

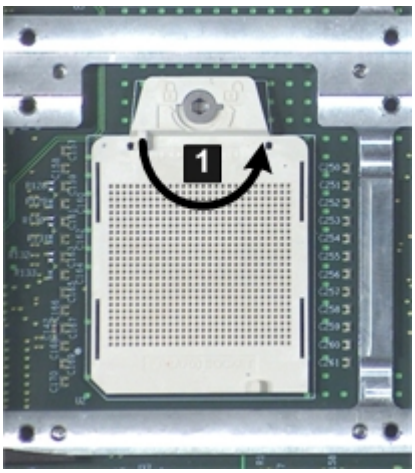
1. Ensure the ZIF socket for the processor you are installing is open.

   Insert the 2.5 mm hex end of the Torx T-15 screwdriver into the ZIF socket and gently try to rotate the socket 180 degrees counter clockwise. If the socket doesn't turn, the socket is open.

   See Figure 44 (page 117).

   NOTE: If you have just removed a processor, the ZIF socket is unlocked.

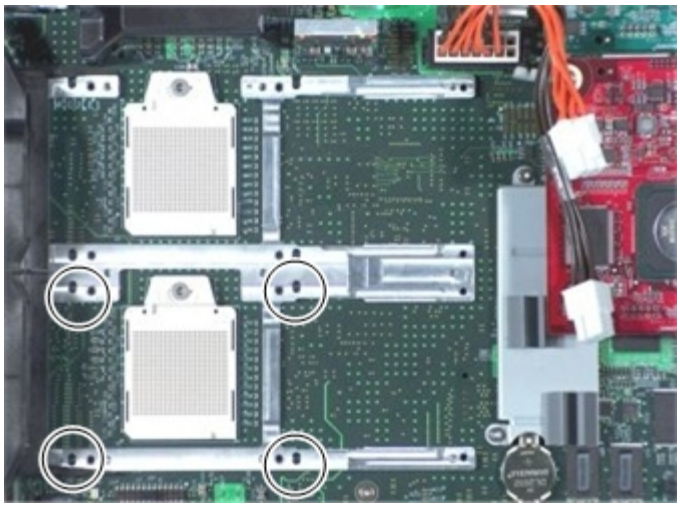
Figure 44 ZIF Socket Unlocked



2. Carefully insert the processor module into the empty processor slot (processor slot 0 is shown) on the server blade system board; then line up the guide pins on the processor to the alignment holes in the processor slot to seat the processor.

   See Figure 45 for the alignment hole locations for processor slot 0.

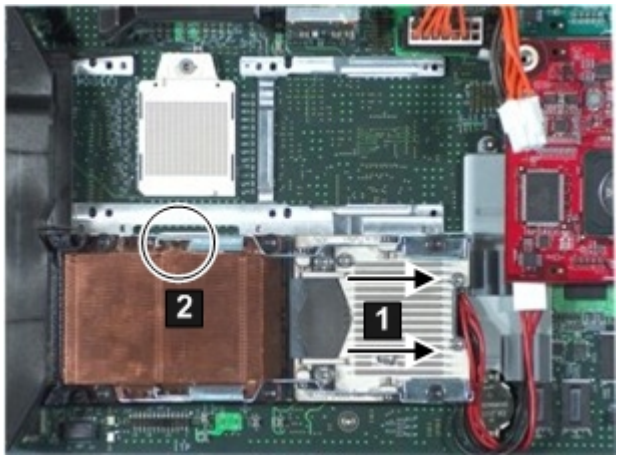
Figure 45 Alignment Holes in Processor Slot 0



3. Slide the processor sequencer to the right and hold it to uncover the ZIF socket.
4. Tighten the ZIF socket with the with the 2.5-mm hex end of the processor installation tool by turning the socket 180 degrees clockwise.

   See Figure 46.

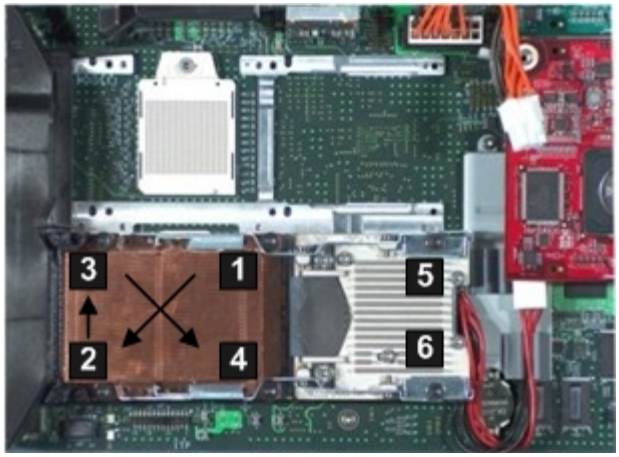
Figure 46 ZIF Socket on Processor Slot 0



5. Release the processor sequencer.
6. Tighten the captive shoulder screws (1 - 4) on the processor heat sink with the Torx T-15 screwdriver.

   See Figure 47 (page 119).
7. Tighten the captive screws (5 - 6) on the processor with the Torx T-15 screwdriver.

Figure 47 Installing a Processor in Slot 0



8. Connect the power cable to the power connector on the processor.
9. Install the access panel.

   See "Replacing the Server Blade Access Panel" (page 112).
10. Place the server blade back into the enclosure and power it up.

    See "Replacing the Server Blade in the Enclosure" (page 111).

Removing and Replacing the SAS Backplane

The following procedures describe how to remove and replace a failed SAS backplane. The server blade backplane supports two SAS disk drives on the SAS backplane.

Removing the SAS Backplane

To remove the failed SAS backplane from the server blade:

1. Power off the server and remove it from the enclosure.

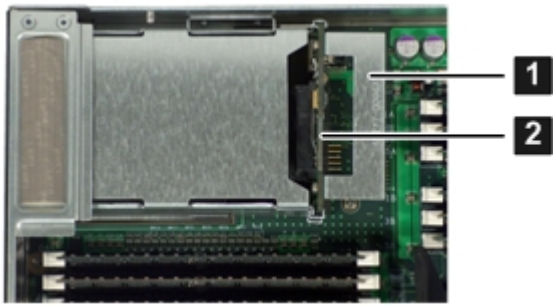
   See "Preparing the Server Blade for Servicing" (page 110).
2. Remove the access panel. See "Removing the Server Blade Access Panel" (page 112).
3. Remove the SAS disk drives or disk drive blanks.

   See "Removing a SAS Disk Drive" (page 108), or "Removing a Disk Drive Blank" (page 109).
4. Remove the access panel.

   See "Removing the Server Blade Access Panel" (page 112).

5. Remove the SAS backplane by lifting it straight out of the server by the backplane handle. See Figure 48.

Figure 48 Removing the SAS Backplane



1 SAS backplane handle

2 SAS backplane

Installing the SAS Backplane

To install the SAS backplane into the server blade after a SAS backplane failure:

1. Slide the SAS backplane into the slot on the system board.
   See Figure 48 (page 120).
2. Install the SAS disk drives, or disk drive blanks, into the server blade.
   See "Replacing a SAS Disk Drive" (page 109), or "Replacing a Disk Drive Blank" (page 110).
3. Install the access panel.
   See "Replacing the Server Blade Access Panel" (page 112).
4. Place the server blade back into the enclosure and power it up.
   See "Replacing the Server Blade in the Enclosure" (page 111).

Removing and Replacing the Front Display Assembly

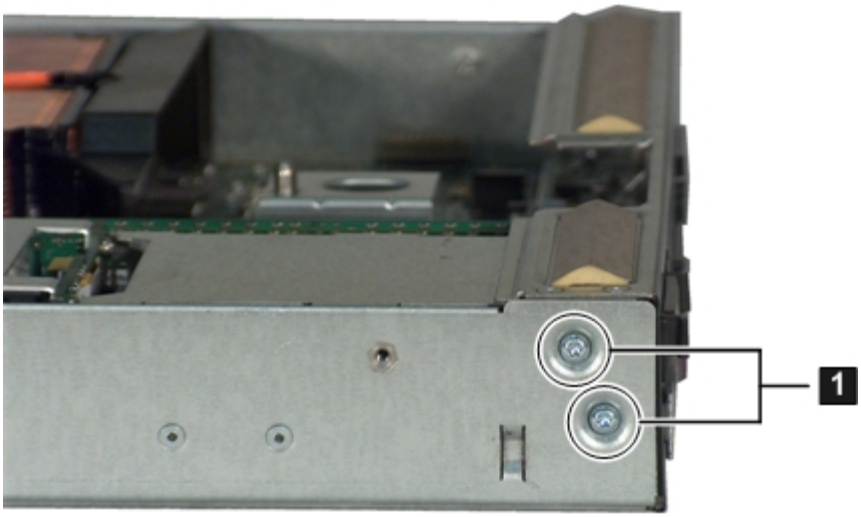
The following procedures describe how to remove and replace the front display assembly on the server blade. The front display assembly is attached to the front of the server blade.

Removing the Front Display Assembly

To remove the failed front display assembly on the server blade:

1. Power off the server and remove it from the enclosure.
   See "Preparing the Server Blade for Servicing" (page 110).
2. Remove the access panel.
   See "Removing the Server Blade Access Panel" (page 112).
3. Remove the four screws that hold the front display assembly to the front of the server blade. There are two screws on each side (1).
   See Figure 49.

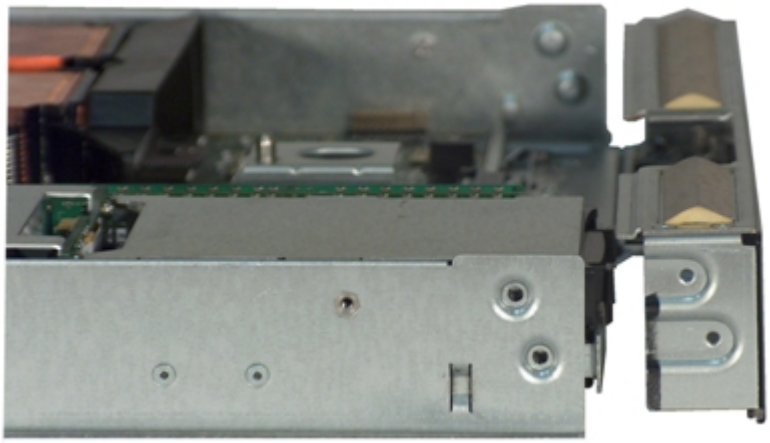
Figure 49 Removing the Front Display Assembly Housing Screws



4. Remove the front display assembly from the front of the server blade by pulling it straight off the front of the server.

   See Figure 50 (page 121).

Figure 50 Removing the Front Display Assembly from the Front of the Server Blade



Replacing the Front Display Assembly

To install the new front display assembly into the server blade after a front display board failure:

1. Slide the front display assembly onto the front of the server blade chassis.

   Make sure the connector on the front display assembly is lined up with the plug on the system board.
2. Attach the front display assembly to the front of the server blade with the Torx T-15 screwdriver.
3. Install the access panel.

   See "Replacing the Server Blade Access Panel" (page 112).
4. Place the server blade back into the enclosure and power it on.

   See "Replacing the Server Blade in the Enclosure" (page 111).

Removing and Replacing the Server Battery

The following procedures describe how to remove and replace the server battery on the system board of the server blade.

Removing the Server Battery

IMPORTANT: Removing the server battery results in a permanent loss of important information that was stored in the server's `nvram`. Removing the server battery results in losing boot configurations and the system logs.

To create a backup of any valued configurations before you remove the battery, HP recommends using `nvrambkp`. Also, be sure to obtain copies of the system logs before removing the battery.

To remove the server battery from the system board:

1. Power off the server and remove it from the enclosure.

   See "Preparing the Server Blade for Servicing" (page 110).
2. Remove the access panel.

   See "Removing the Server Blade Access Panel" (page 112).
3. Note the position of the battery in the socket for the installation of the replacement battery.

WARNING! Do not attempt to remove the battery by hand. Doing so can cause the battery holder to separate from the system board.

WARNING! Do not attempt to remove the battery from the side marked "+" first. If your battery holder does not have the "+" marking, the side of the holder with springs will be the "+" end.

4. Using a nonconductive tool small enough to fit into the battery slot as leverage, gently remove the battery from the holder from the end marked "–".

NOTE: HP recommends using ESD safe, non-conductive tweezers or a similar tool.

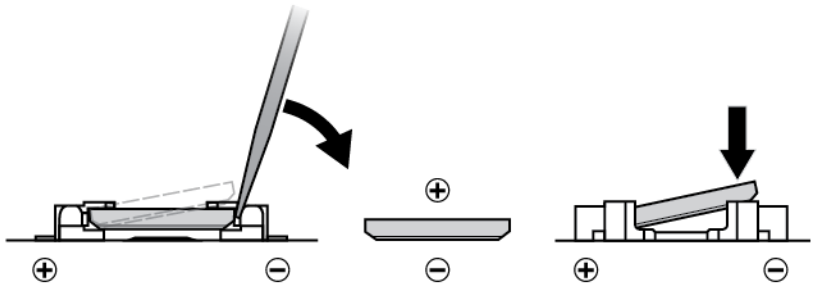
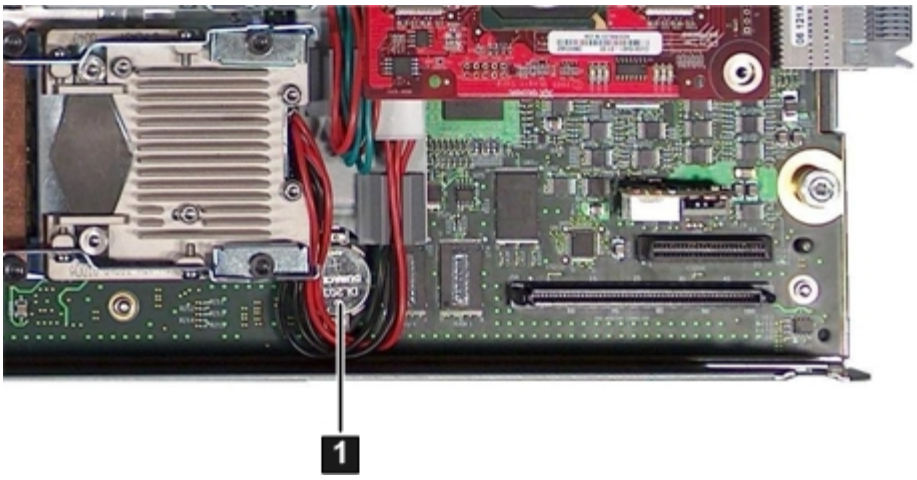


Figure 51 (page 123) shows the location of the server battery on the system board (1).

Figure 51 Server Battery Location



1 Server battery on the system board

5. Dispose of the server battery by following your local requirements.

Replacing the Server Battery

To replace the server battery:

1. Install the new server battery by gently pushing the battery into the socket. Move the processor 0 power cable if necessary.

IMPORTANT: Ensure that the new battery is fully seated and that all locking tabs are correctly engaged.

2. Install the access panel. See "Replacing the Server Blade Access Panel" (page 112).
3. Place the server blade back into the enclosure and power it on. See "Replacing the Server Blade in the Enclosure" (page 111).

Removing and Replacing the Mezzanine Cards

The following procedures describe how to remove and replace the three mezzanine cards available on the server blade. The server blade supports up to three PCIe mezzanine cards. Slot 1 is a PCIe x4 slot, and slots 2 and 3 are PCIe x8 slots.

Removing a Mezzanine Card

To determine which card you are replacing, see Figure 52 (page 124). For more information regarding the different cards supported by the server blade, see http://h71028.www7.hp.com/enterprise/cache/316682-0-0-0-121.html?jumpid=reg_R1002_USEN.

To remove a mezzanine card from the server blade:

1. Power off the server and remove it from the enclosure.

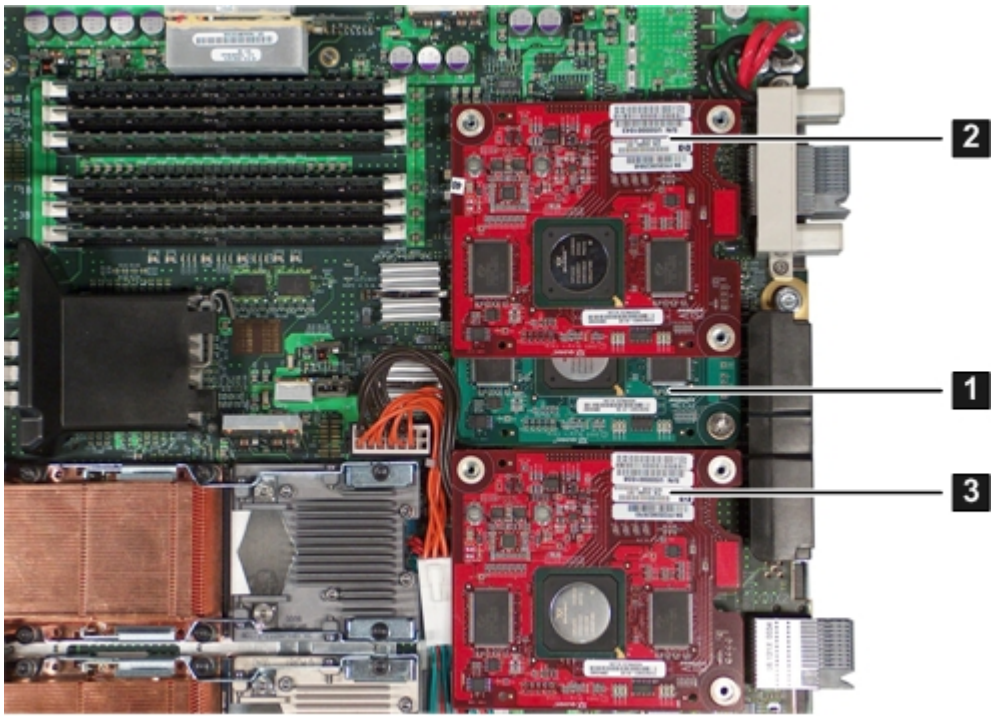
   See "Preparing the Server Blade for Servicing" (page 110).
2. Remove the access panel.

   See "Removing the Server Blade Access Panel" (page 112).
3. Unscrew the thumbscrews holding the card you are replacing.

4. Grasp the mezzanine card by the edges and lift it off of the port.

NOTE: Mezzanine card 2 is installed above mezzanine card 1 on the system board. If you remove mezzanine card 1, remove mezzanine card 2 to access it (if it is installed).

Figure 52 Server Blade with All Three Mezzanine Cards Installed



1 Mezzanine card 1 (PCIe x4)
2 Mezzanine card 2 (PCIe x8)
3 Mezzanine card 3 (PCIe x8)

Replacing a Mezzanine Card

To replace a mezzanine card on the system board:

NOTE: If you are installing mezzanine card 1, remove mezzanine card 2 to access it (if necessary). Mezzanine card 2 is installed above mezzanine card 1 on the system board.

For a matrix of supported mezzanine cards, see http://h71028.www7.hp.com/enterprise/cache/316682-0-0-0-121.html?jumpid=reg_R1002_USEN.

1. Grasp the mezzanine card by its edges, and line the card up with the post on the system board. See Figure 52 (page 124) for mezzanine card locations on the system board.
2. Push down on the card right above the port to seat it into the port.
3. Tighten the three thumbscrews to secure the card to the system board.
4. Install the access panel.

   See "Replacing the Server Blade Access Panel" (page 112).
5. Place the server blade back into the enclosure and power it up.

   See "Replacing the Server Blade in the Enclosure" (page 111).

Removing and Replacing a Cache Module

The following procedures describe how to remove and replace a cache module from the server blade. Cache modules are used by some mezzanine controller boards.

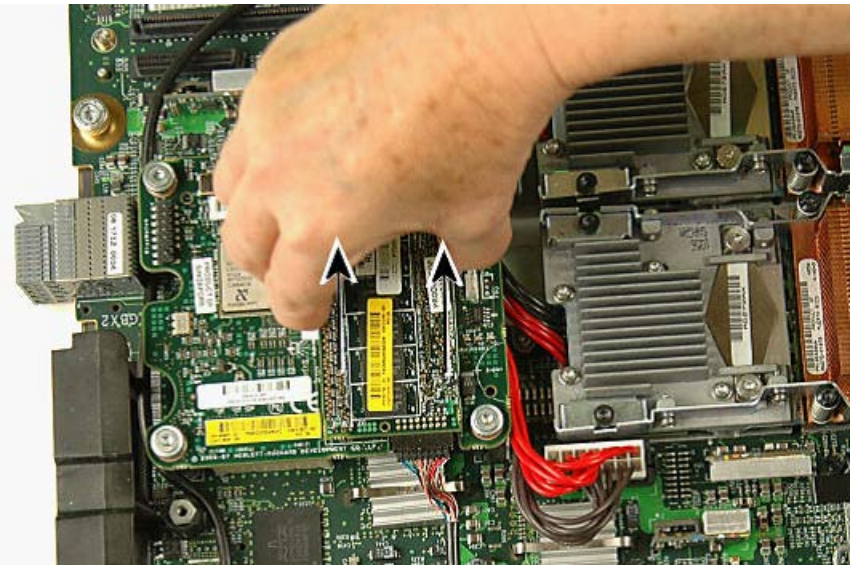
Removing a Cache Module

CAUTION: To avoid bending the controller board, only remove or replace the cache module when it is installed in the server blade.

To remove a cache module:

1. If the BBWC battery will also be removed:
   a. Back up all data.
   b. Close all applications.
2. Power of the server blade and remove it from the enclosure.
   See "Preparing the Server Blade for Servicing" (page 110).
3. Remove the access panel.
   See "Removing the Server Blade Access Panel" (page 112).
4. Remove any mezzanine cards blocking the cache module.
   See "Removing a Mezzanine Card" (page 123).
5. Pull straight up on the cache module to remove it from the controller.

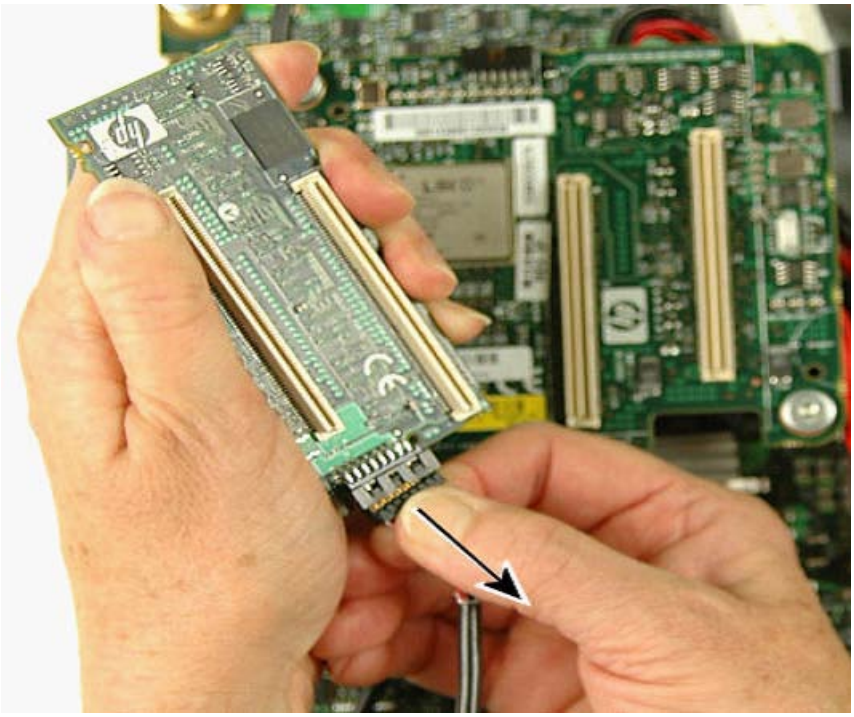
Figure 53 Removing the Cache Module



CAUTION: The BBWC battery must remain connected to the cache module to preserve the data when removing the cache module to transfer data.

6. If only replacing the cache module, unplug the battery cable from the cache module.

Figure 54 Disconnecting the Battery



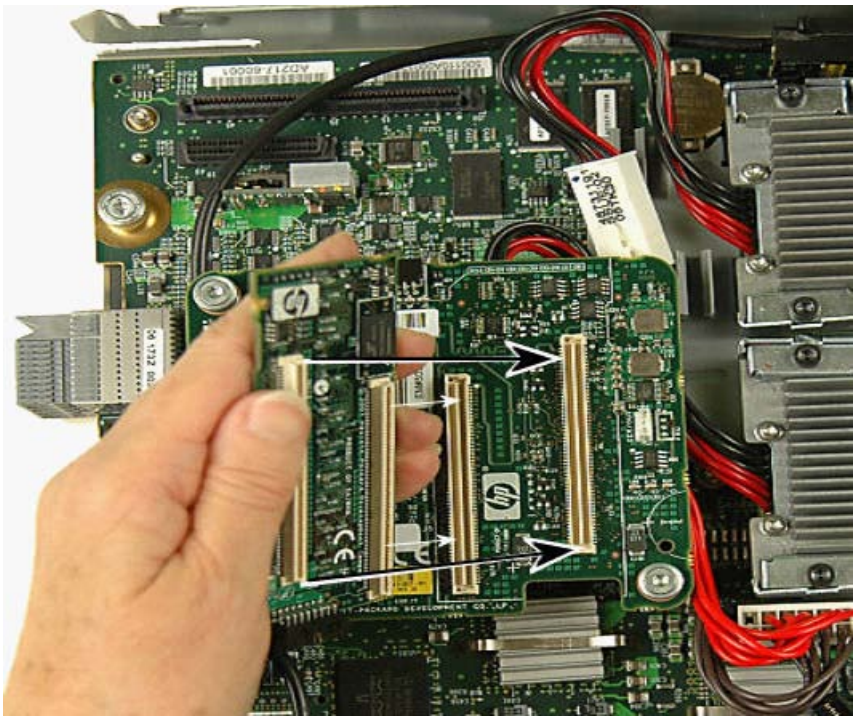
Replacing the Cache Module

CAUTION: To avoid bending the controller board, only remove or replace the cache module when it is installed in the server blade.

To replace a cache module:

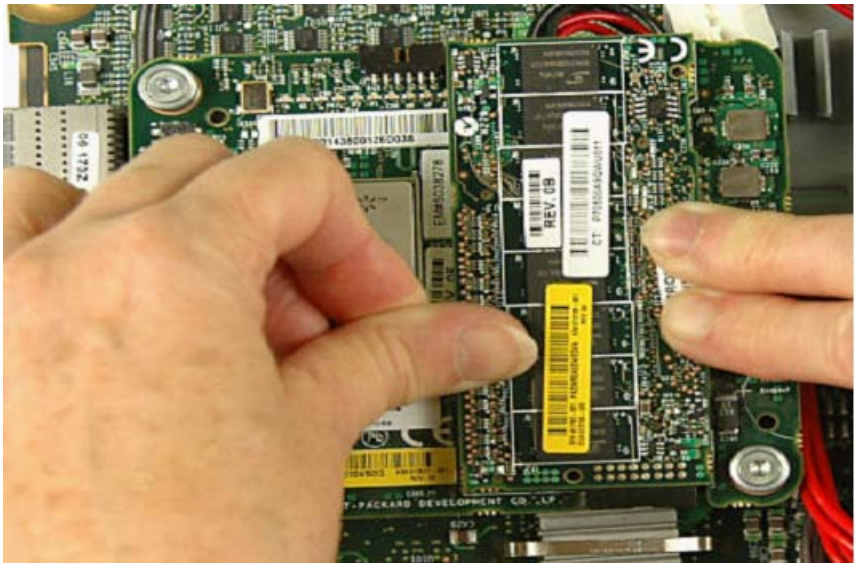
1. With the cache module battery connector facing the side of the server blade that memory cell 1 abuts, line up the cache module's two connectors with the two corresponding slots on the mezzanine controller board.

Figure 55 Lining Up the Cache Module



2. Press straight down on the cache module until it snaps into place.

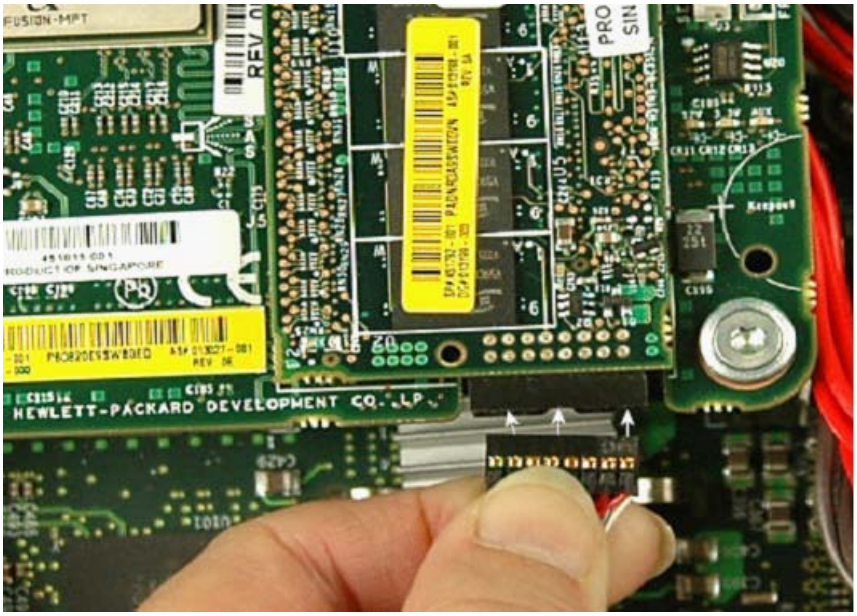
Figure 56 Pressing Down the Cache Module



3. Plug the battery cable into the cache module battery connector.

NOTE: The lip of the battery cache module plug has three tiny tabs that should face down.

Figure 57 Attaching the Battery Cable



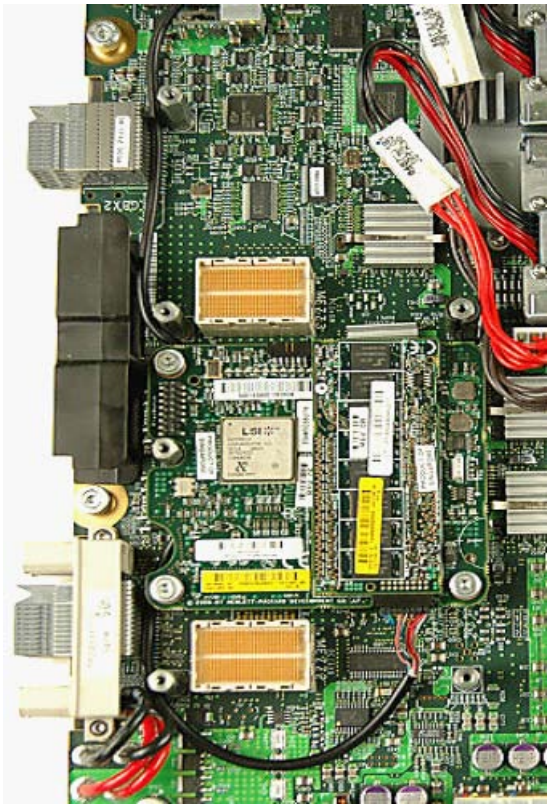
NOTE: Only use the 24 inch BBWC cable.

IMPORTANT: The BBWC battery must remain connected to the cache module to preserve the data when removing the cache module to transfer data. Therefore, route the BBWC cable so that the cache module and battery can be removed together.

4. If the controller is in mezzanine slot 1 or 2 route the cable along the following path:
   a. Under the CPU 0 power pod wires
   b. Along the rear of the server blade
   c. Inside the two mezzanine posts near the rear chassis plug
   d. Outside all other mezzanine card posts

e. Between the outermost mezzanine 2 post and the server blade power connector cables

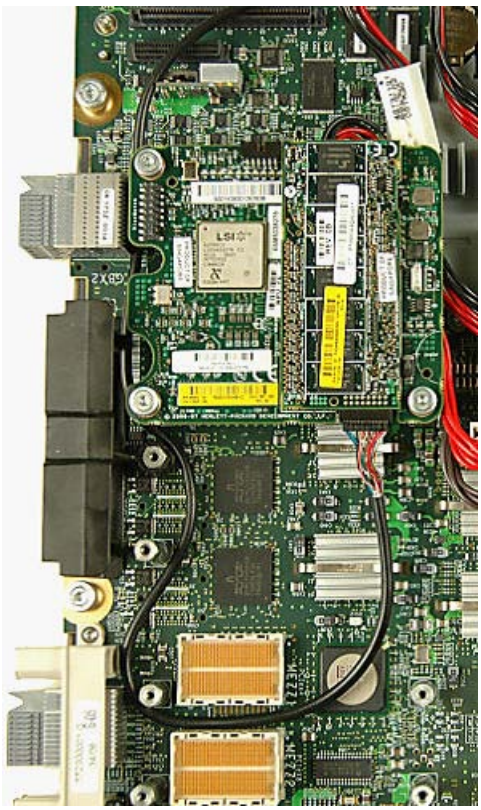
Figure 58 Mezzanine Slot 1 or 2 BBWC Cable Routing



5. If the controller is in mezzanine slot 3 route the cable along the following path:
   a. Under the CPU 0 power pod wires
   b. Along the rear of the server blade
   c. Inside the mezzanine posts near the rear chassis plug
   d. Outside all other mezzanine card posts

e. Between mezzanine slots 1 and 2.

Figure 59 Mezzanine Slot 3 BBWC Cable Routing



6. Replace any mezzanine cards that were removed.
   See "Replacing a Mezzanine Card" (page 124).
7. Install the access panel.
   See "Replacing the Server Blade Access Panel" (page 112).
8. Place the server blade back into the enclosure and power it up.
   See "Replacing the Server Blade in the Enclosure" (page 111).

Removing and Replacing the Low Profile Battery Backed Write Cache (BBWC) Battery

The following procedures describe how to remove and replace the BBWC battery from the server blade. The BBWC is used by some mezzanine controller boards.

Removing the BBWC Battery

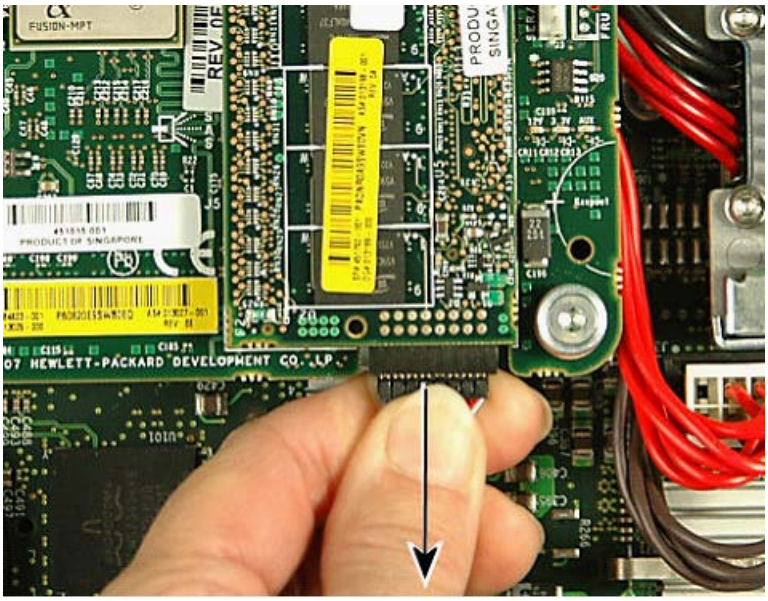
To remove the BBWC battery:

1. Back up all data.
2. Close all applications.
3. Power of the server blade and remove it from the enclosure.
   See "Preparing the Server Blade for Servicing" (page 110).
4. Remove the access panel.
   See "Removing the Server Blade Access Panel" (page 112).
5. Remove any mezzanine cards blocking access to the mezzanine controller board.
   See "Removing a Mezzanine Card" (page 123).

6. **CAUTION:** The BBWC battery must remain connected to the cache module to preserve the data when removing the cache module to transfer data.

   If replacing the battery, unplug the battery cable from the cache module.

Figure 60 Disconnecting the BBWC Cable from the Cache Module

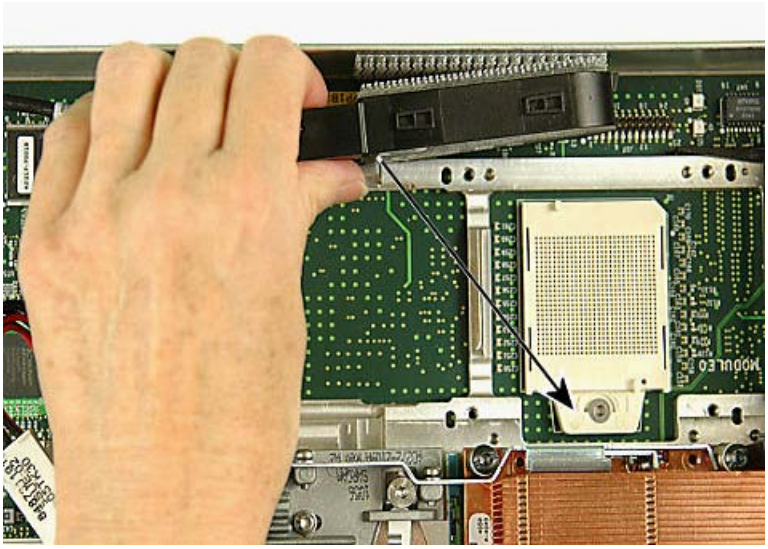


7. Remove CPU 0.

   See "Removing a Processor" (page 116).

8. Starting from the end near the rear of the server blade, pry the BBWC battery off the chassis.

Figure 61 Removing the BBWC Battery



9. If replacing the battery, invert the BBWC battery and push the battery plug out of the battery connector.

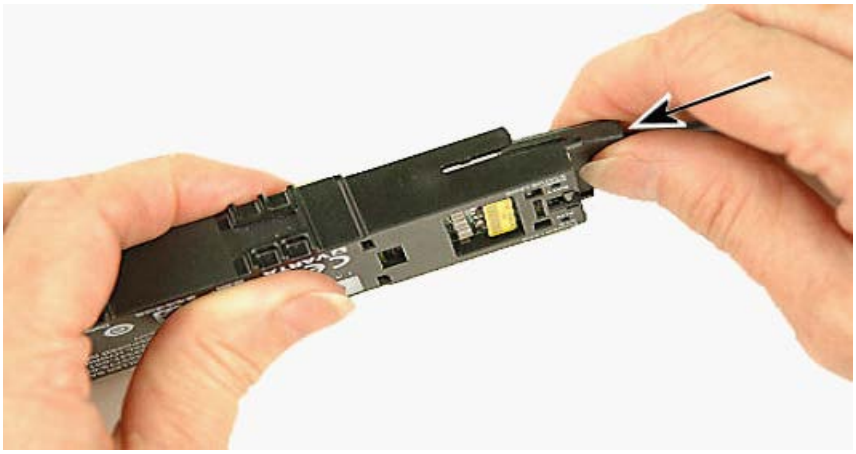
Figure 62 Releasing the Battery Cable from the Battery

Replacing the BBWC Battery

To replace the BBWC battery:

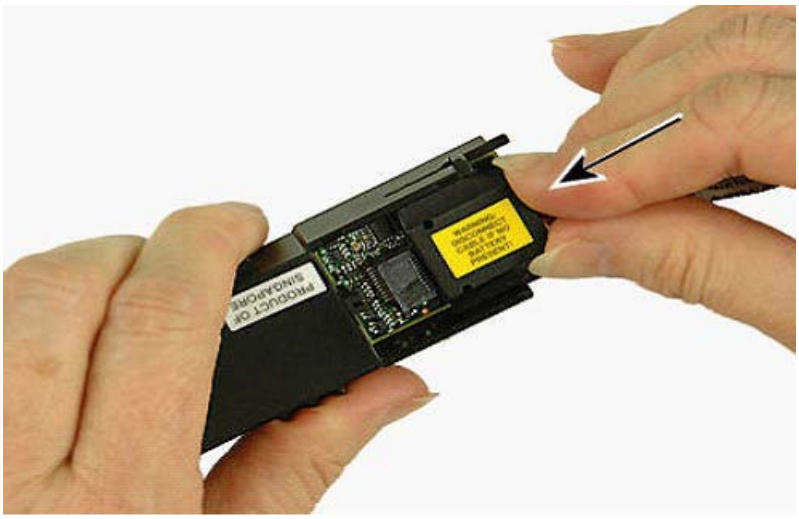
1. Invert the BBWC battery (print side down) and with the cable plug label (contoured) side up, line up the plug edges with the thin slits on the sides of the battery.

Figure 63 Lining up the Plug



2. Push the battery cable plug into the battery connector until it snaps into place.

Figure 64 Connecting the Battery Cable



3. Remove CPU 0.

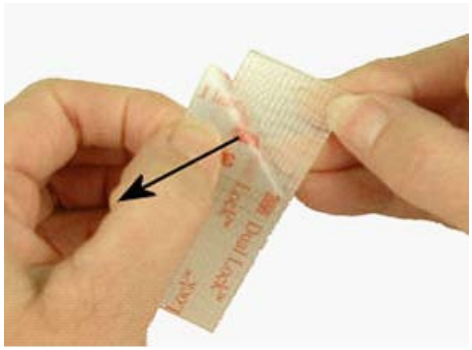
   See "Removing a Processor" (page 116).

4. If this is the first BBWC battery to ever have been installed in the server blade:

   a. **NOTE:** If the bottom of the battery or top of the battery holder are dirty or oily, clean their surfaces with a 50–50 mixture of Isopropyl alcohol and water before applying the stickers.

   Remove the protector from the sticky side of one of the plastic Dual Lock hook and loop stickers.

   Figure 65 Removing the Protector from the Sticker

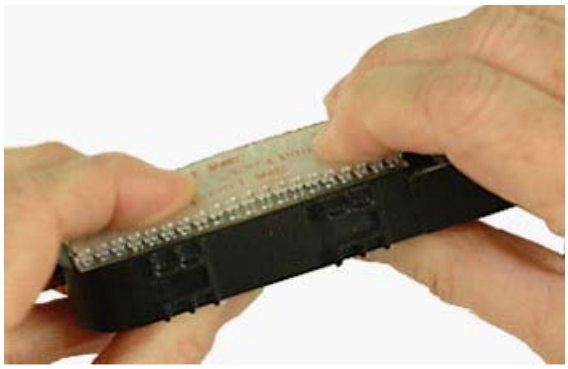


   b. Place the sticker on the bottom of the BBWC battery **(not over the open area)**.

Figure 66 Placing the Sticker

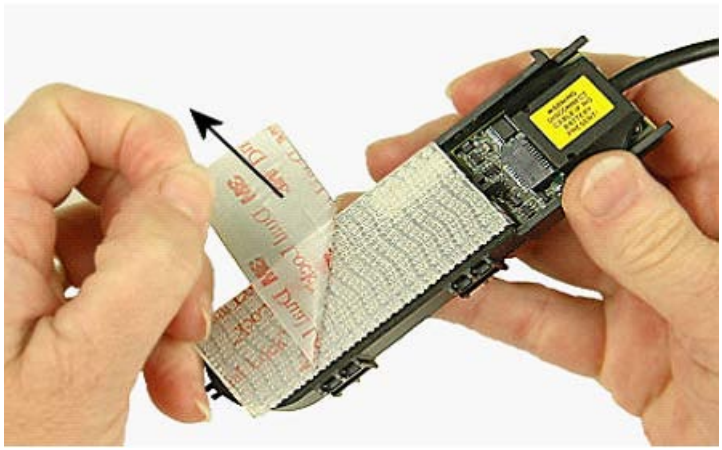
c. Line up the wavy side of the second sticker with the wavy side of the first sticker and press down until they stick together.

Figure 67 Connecting the Stickers



d. Remove the protector from the second sticker to expose the sticky surface.

Figure 68 Removing the Protector



e. **IMPORTANT:** The battery must be positioned so it does not block access to the system battery, does not rest on the system board, and is about 1/4 inch below the top of the chassis wall so that it will clear the access cover.

Press the side of the battery with the exposed Dual Lock hook and loop sticker against the side of the chassis wall next to the CPU 0 position. so it does not block access to the system battery

Figure 69 Attaching BBWC Battery to Chassis Wall

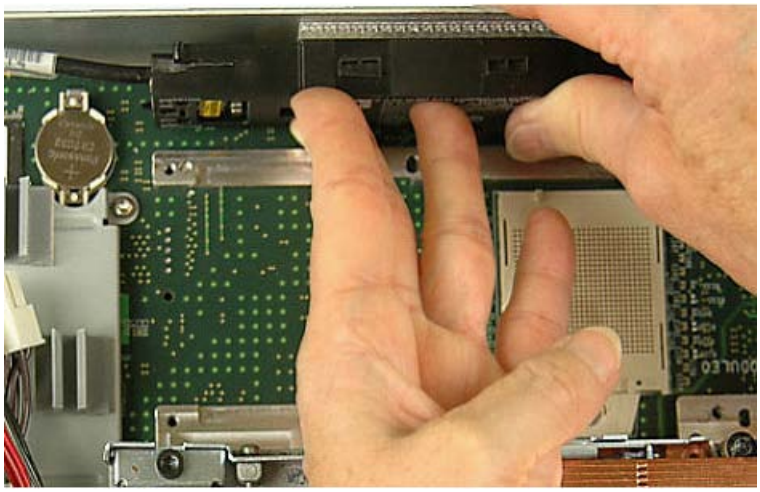
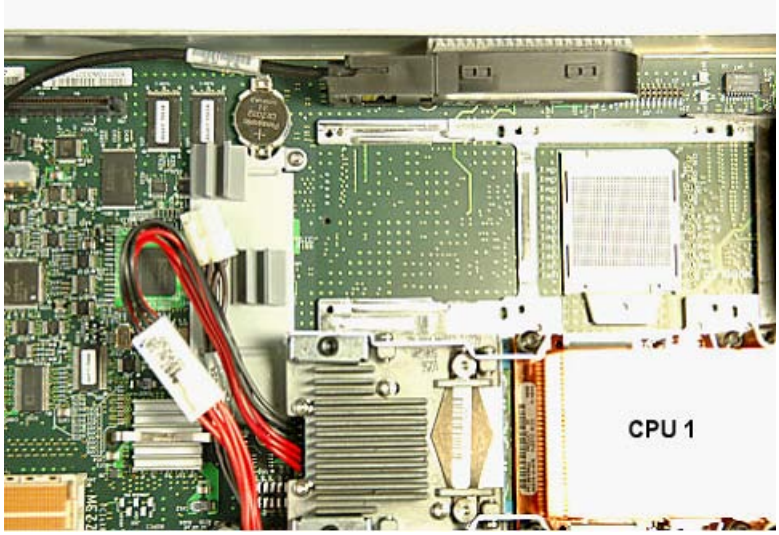


Figure 70 BBWC Battery Attached to Chassis Wall

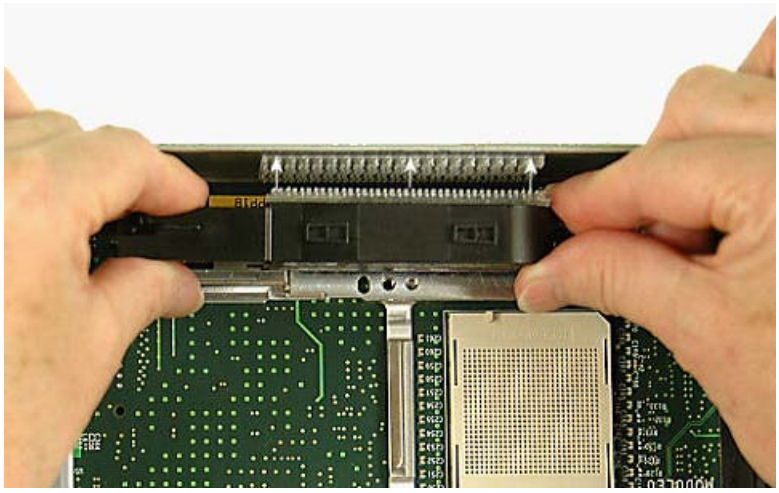


5. If this is a BBWC battery replacement:
   a. Remove the protector from the sticky side of one of the plastic Dual Lock hook and loop stickers.
   b. Place the sticker on the bottom of the BBWC battery **(not over the open area)**.

Figure 71 Placing Sticker

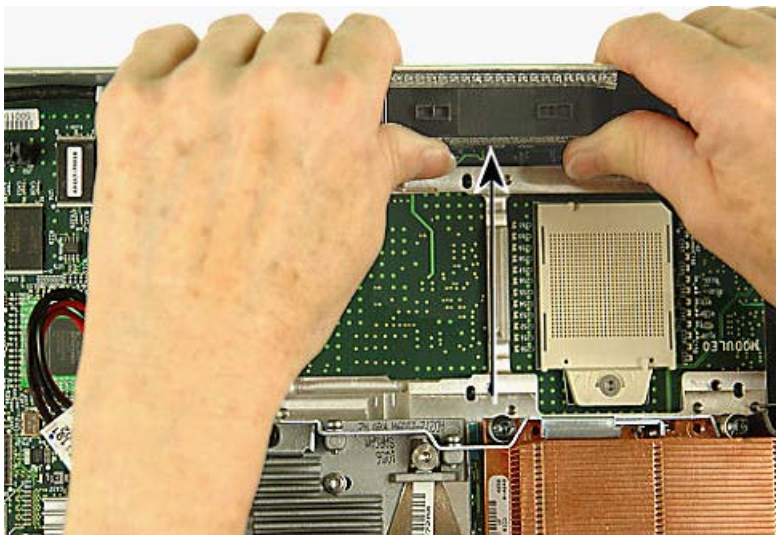
c. Line up the sticker with the Daul Lock hook and loop sticker on the chassis wall by CPU 0.

Figure 72 Lining Up the Sticker



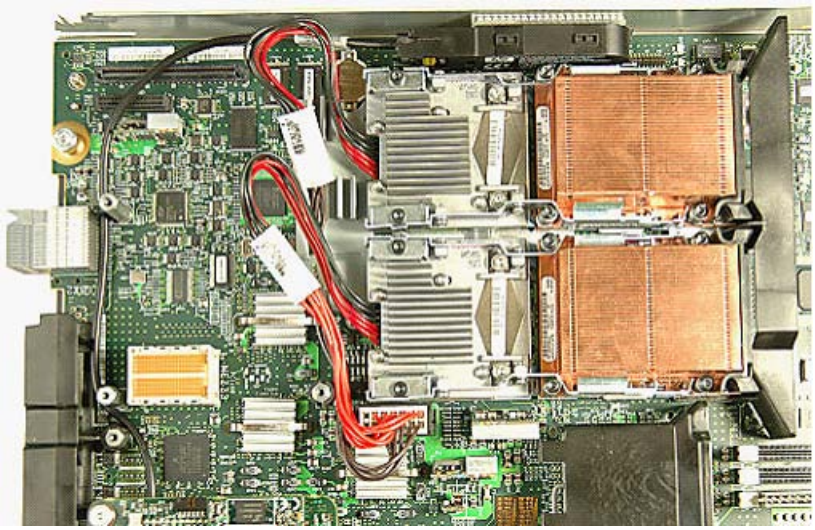
d. Press against the battery until the two stickers stick together to hold the battery in place.

Figure 73 Attaching the BBWC Battery to the Chassis



6. Replace CPU 0.
   See "Installing a Processor" (page 117).

Figure 74 CPU 0 Replaced



7. Remove any mezzanine cards blocking access to the mezzanine controller board.
   See "Removing a Mezzanine Card" (page 123).

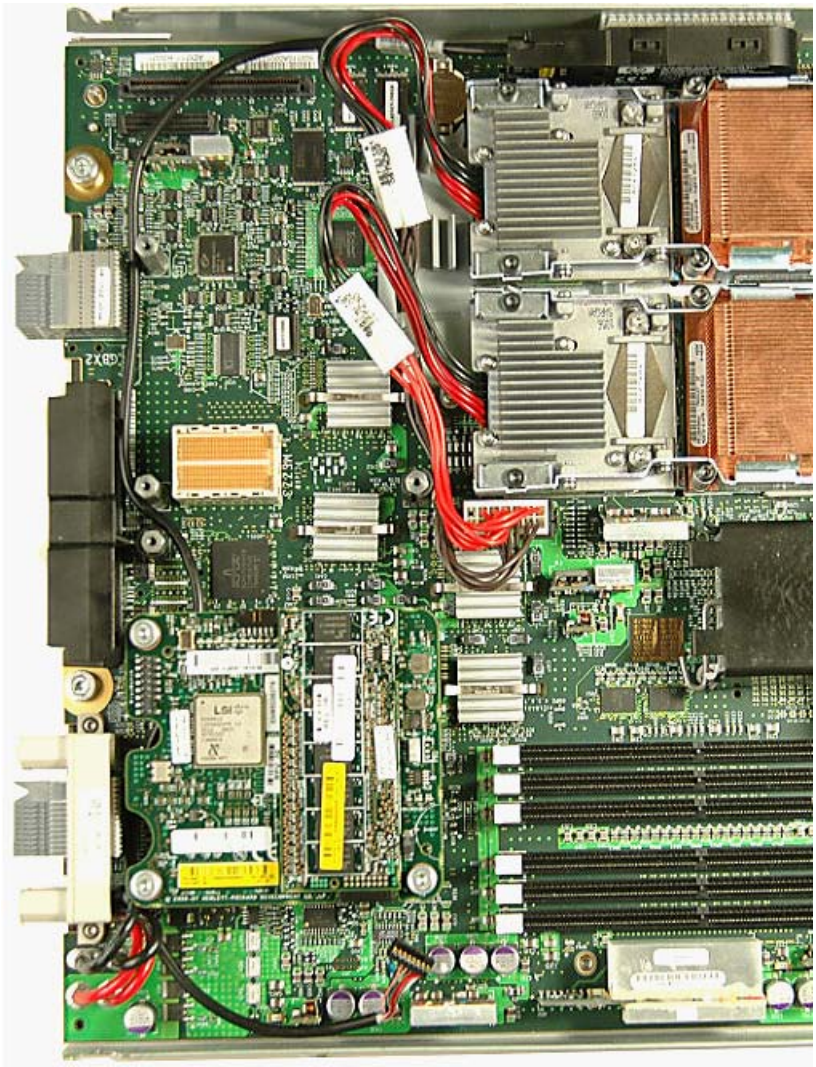
IMPORTANT: The BBWC battery must remain connected to the cache module to preserve the data when removing the cache module to transfer data. Therefore, route the BBWC cable so that the cache module and battery can be removed together.

NOTE: Only use the 24 inch BBWC cable.

8. If the controller is in mezzanine slot 1 or 2 route the cable along the following path:
   a. Under the CPU 0 power pod wires
   b. Along the rear of the server blade
   c. Inside the two mezzanine posts near the rear chassis plug
   d. Outside all other mezzanine card posts

e. Between the outermost mezzanine 2 post and the server blade power connector cables

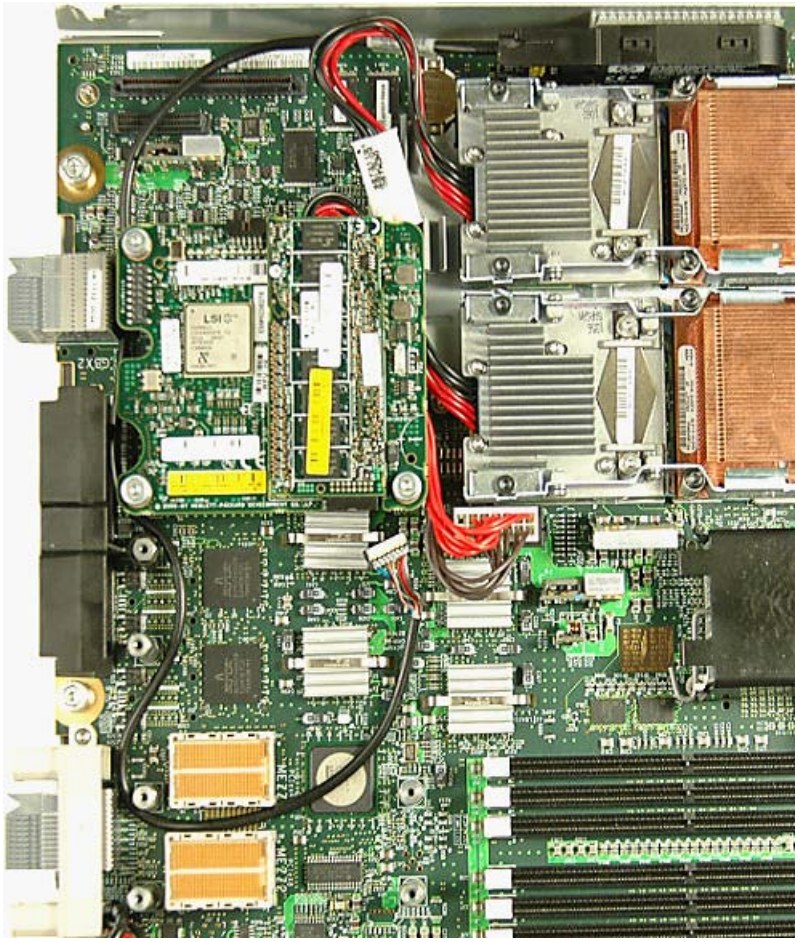
Figure 75 Mezzanine Slot 1 or 2 BBWC Cable Routing



9. If the controller is in mezzanine slot 3 route the cable along the following path:
   a. Under the CPU 0 power pod wires
   b. Along the rear of the server blade
   c. Inside the mezzanine posts near the rear chassis plug
   d. Outside all other mezzanine card posts

e. Between mezzanine slots 1 and 2.

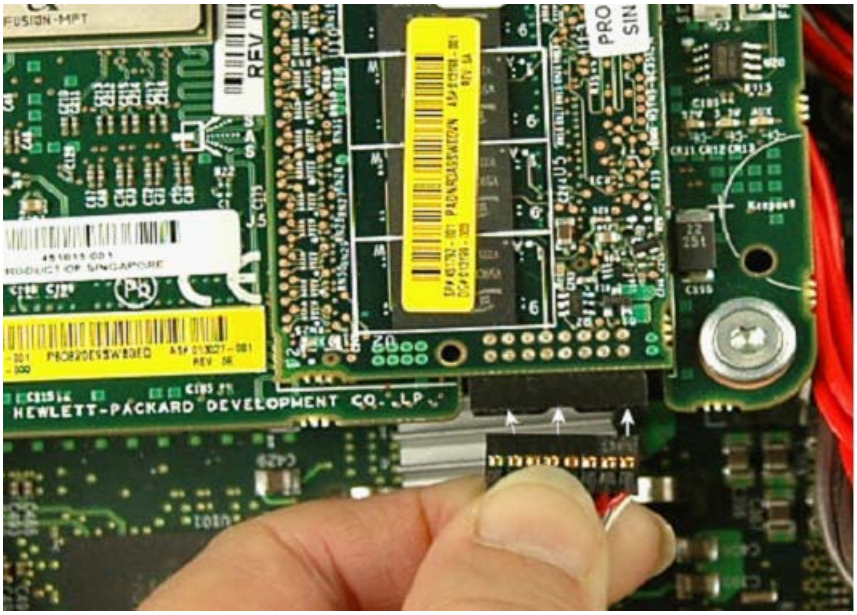
Figure 76 Mezzanine Slot 3 BBWC Cable Routing



10. Plug the battery cable into the cache module battery connector.

NOTE: The lip of the battery cache module plug has three tiny tabs that should face down.

Figure 77 Attaching the Battery Cable



11. Replace any mezzanine cards that were removed.
    See "Replacing a Mezzanine Card" (page 124).
12. Install the access panel.
    See "Replacing the Server Blade Access Panel" (page 112).
13. Place the server blade back into the enclosure and power it up.
    See "Replacing the Server Blade in the Enclosure" (page 111).

NOTE: After installing a BBWC battery, you might see a POST message during reboot indicating the array accelerator (cache module) is temporarily disabled. This is normal, because the new BBWC battery will probably have a low charge. You do not need to take any action, because the recharge process begins automatically when the server blade is installed in the enclosure. The mezzanine controller board will operate properly while the BBWC battery recharges, although the performance advantage of the array accelerator will be absent. Once the BBWC battery charges up to a satisfactory level, the array accelerator is automatically enabled.

Removing and Replacing the Trusted Platform Module

The following procedures describe how to remove and replace the Trusted Platform module (TPM) from the server blade. The TPM is a microcontroller that stores digital keys, passwords, and certificates. The TPM is mounted on the system board near the front display board.

IMPORTANT: You must be running the supported version of the HP-UX operating system to use the TPM security component.

Replacing the TPM **must** be performed by an HP CE, but you can move a TPM from a failed system board to a new system board.

Removing the TPM

To remove the TPM:

1. Record the current TPM state by doing the following:
   a. Reboot to EFI
   b. Enter `infosec` (or `secconfig`) to display the server security settings.
2. Back up the current TPM setting in the OS
   See your OS documentation for more information.
3. Power off the server and remove it from the enclosure.
   See "Preparing the Server Blade for Servicing" (page 110).
4. Remove the access panel.
   See "Removing the Server Blade Access Panel" (page 112).

5. Grasp the failed TPM and pull it straight up off the system board.
   See Figure 78 (page 141) for the location of the TPM on the system board.

Figure 78 TPM Location on the System Board

Replacing the TPM

To install the TPM:

IMPORTANT: You must be running the supported version of the HP-UX OS to use the TPM security component.

The TPM replacement must be performed by an HP CE.

1. Install the new TPM on the system board by pushing it down onto the posts on the system board.
   For the location of the TPM on the system board, see Figure 78 (page 141). The TPM is keyed to fit only one way.
2. Install the access panel.
   See "Replacing the Server Blade Access Panel" (page 112).
3. Place the server blade back into the enclosure and power it up.
   See "Replacing the Server Blade in the Enclosure" (page 111).
4. Synchronize the TPM state with the system board by doing the following:
   Examine the current TPM state at EFI by using the `secconfig` command.
   - If the TPM is enabled, disable it with the `secconfig tpm on` command.
   - If the TPM is disabled, enable it with the `secconfig tpm off` command.
5. Reboot the server blade.
   Ignore all TPM errors during boot
6. Set the TPM to the recorded state in step 1 of "Removing the TPM" (page 140).
   - If the TPM is disabled, enable it with the `secconfig tpm on` command.
   - If the TPM is enabled, disable it with the `secconfig tpm off` command.
7. Reboot the server blade.
   Make sure there are no errors during boot.

Removing and Replacing the System Board

The following procedures describe how to remove and replace the system board from the server blade. When a system board fails, you must remove the following components from the failed system board (unless they caused the failure), and install them on the new system board:

- SAS disk drives
- Memory DIMMs
- Processors
- SAS backplane
- Mezzanine cards
- TPM

CAUTION: Electrostatic discharge can damage electronic components. Ensure you are properly grounded before beginning any removal or installation procedure.

For more information, see the "Safety Information" (page 26).

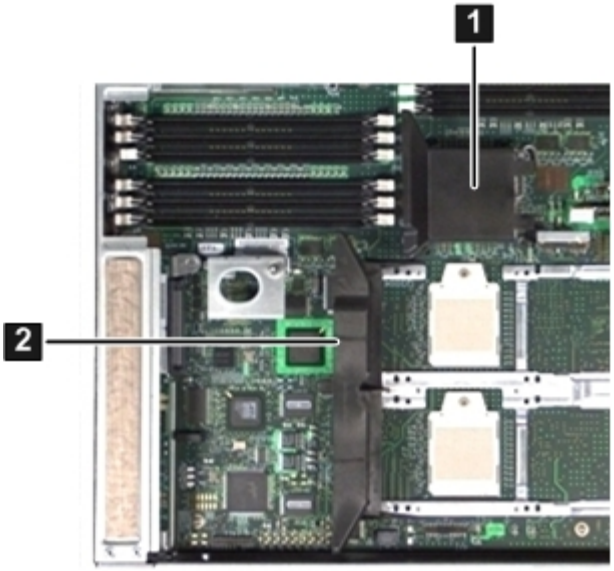
Removing the System Board

IMPORTANT: It is not necessary to remove the server battery from the system board.

To remove a system board from the server blade:

1. Power off the server and remove it from the enclosure.
   See "Preparing the Server Blade for Servicing" (page 110).
2. Remove the access panel.
   See "Removing the Server Blade Access Panel" (page 112).
3. Remove the hard disk drives.
   See "Removing a SAS Disk Drive" (page 108).
4. Remove the memory DIMMs.
   See "Removing a DIMM" (page 114).
5. Remove the processors. See "Removing a Processor" (page 116).
6. Remove the SAS backplane.
   See "Removing the SAS Backplane" (page 119).
7. Remove the mezzanine cards.
   See "Removing a Mezzanine Card" (page 123).
8. Remove the controller air baffle from the system board by undoing the tabs and lifting the air baffle out of the server.
   See Figure 79 (page 143) for the location of the air baffles.
9. Remove the processor air baffle by unsnapping it from the processor frame and lifting the air baffle out of the server.

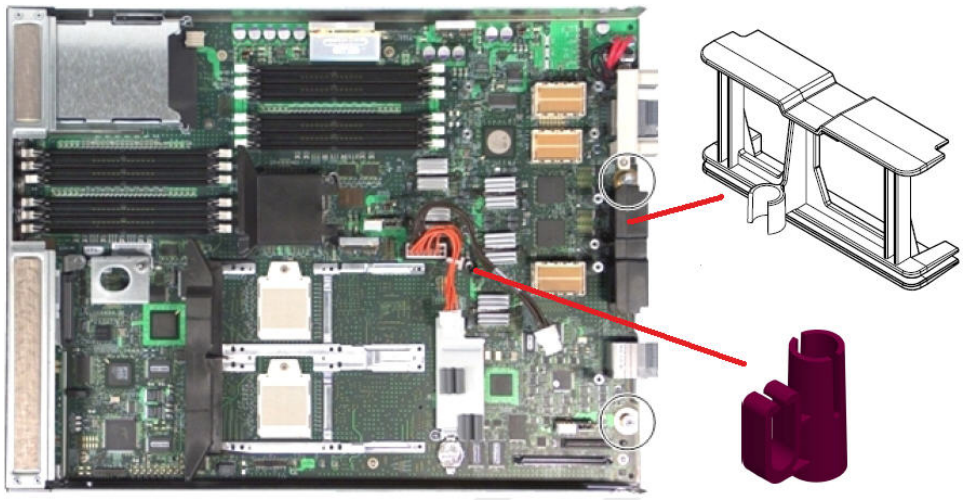
Figure 79 Air Baffle Locations



1 Controller air baffle 2 Processor air baffle

10. Remove the rear air baffle and the CPU power cable holder from the system board (Figure 80).

Figure 80 Rear Air Baffle and CPU Power Cable Holder Location

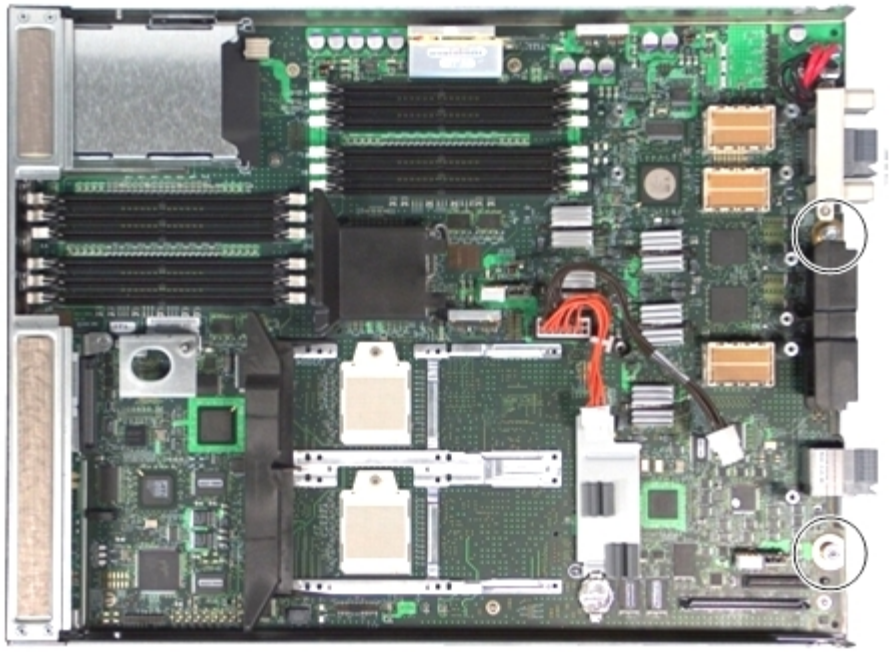


11. Remove the TPM.
    See "Removing the TPM" (page 140).

NOTE: The system board is attached to the front display panel.

12. Loosen the two captive thumbscrews toward the back of the system board.
    See Figure 81 (page 144) for the thumbscrew locations.

Figure 81 System Board



13. To disengage the system board from the connector on the front display board and the keyways on the server blade chassis, use the two thumbscrews as handles to slide the system board out the back of the sheet metal frame.
14. Lift the system board out of the server blade.

Replacing the System Board

NOTE: The system board comes with the server battery already installed.

To install a system board in the server blade after a system board failure:

1. Remove the front display panel from the server blade.

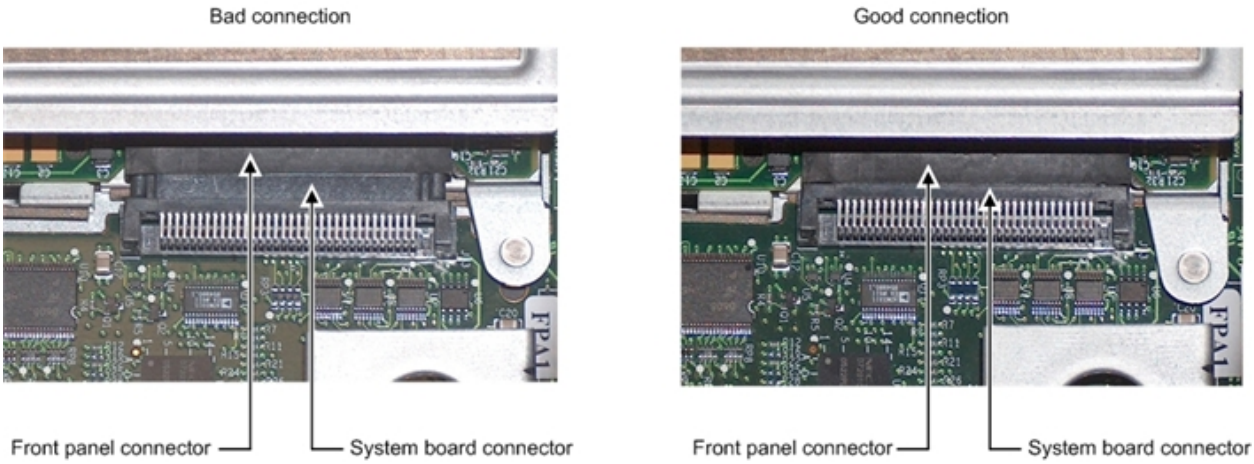
   See "Removing the Front Display Assembly" (page 120).
2. Install the system board into the server by lining up the keyways on the bottom of the system board with the pins on the server blade chassis.
3. Slide the system board toward the front of the sheet metal tray until the two thumbscrews on the system board align with their mating standoffs on the sheet metal tray.
4. Tighten the two thumbscrews on the system board.
5. Install the front display panel.

   See "Replacing the Front Display Assembly" (page 121).

IMPORTANT: Make sure the front display panel connector fully seats into the system board connector. If the connector is not fully seated, the server blade can have intermittent failures.

See Figure 82.

Figure 82 System Board / Front Panel Connection



In Figure 1–Bad connection, the connector is not properly seated. In Figure 2–Good connection, the connector is properly seated.

6. Install the TPM.
   See "Replacing the TPM" (page 141).
7. Install the air baffles.
   See Figure 79 (page 143).
8. Install the mezzanine card or cards.
   See "Replacing a Mezzanine Card" (page 124).
9. Install the SAS backplane.
   See "Installing the SAS Backplane" (page 120).
10. Install the memory DIMMs.
    See "Replacing a DIMM" (page 115).
11. Install the processors.
    See "Installing a Processor" (page 117).
12. Install the hard disk drives.
    See "Replacing a SAS Disk Drive" (page 109).
13. Install the access panel.
    See "Replacing the Server Blade Access Panel" (page 112).
14. Install the server blade into the enclosure.
    See "Replacing the Server Blade in the Enclosure" (page 111).

A Parts Information

This appendix provides parts information for the HP Integrity BL860c server blade components (customer replaceable units [CRUs]).

Server Blade Components List

Table 29 details the part numbers of the components (or CRUs) in the server blade.

NOTE: Part numbers are found by using the part nomenclature from this list to select the correct part from the HP Partsurfer. If a part that is not listed in the CRU list needs to be replaced, the Base Unit Repair Kit is required. Remove processors, DIMMs and HDDs, and transfer these to the new base unit.

Table 29 CRU List

Description	Manufacturing Part Number	Replacement Part Number	Exchange Part Number
Memory			
512 MB DDR2 memory	AB563AX		AB563–69001
1 GB DDR2 memory	AB564BX		AB564–69002
2 GB DDR2 memory	AB565BX		AB565–69002
4 GB DDR2 memory	AB566BX		AB566–69002
Processors			
Itanium CPU 1.6 GHz 3 MB	AD272–2107B	AD272–2107B	AD272–69001
Itanium CPU 1.4 GHz 12 MB	AD271–2101B	AD271–2101B	AD271–69001
Itanium CPU 1.6 GHz 18 MB	AD270–2101B	AD270–2101B	AD270–69001
Itanium CPU 1.42 GHz 12 MB dual core	AD394–2101C	AD394–2101CN	AD394–69001
Itanium CPU 1.6 GHz 12 MB single core	AD395–2102C	AD395–2102CN	AD395–69001
Itanium CPU 1.67 GHz 18 MB dual core	AD396–2101C	AD396–2101CN	AD396–69001
Internal Disks			
36 GB, 10k RPM SAS hot-plug disk	375860–B21	376596–001	
36 GB, 15k RPM SAS hot-plug disk	431934–B21	432322–001	
72 GB, 10k RPM SAS hot-plug disk	375862–B21	376597–001	
72 GB, 15k RPM SAS hot-plug disk	431936–B21	432321–001	
146 GB, 10k RPM SAS hot-plug disk	431959–B21	432320–001	
Boards and Cards			
Rev. A. BL860c system board	AD217–60001	AD217–67001	AD217–69001
Rev. B. BL860c system board	AD217–60101		• AD217-69101 • AD217-69301
2 disk drive SAS backplane	AD217–60003	AD217–67003	
Front panel display assembly	AD217–2002B	AD217–67002	
Dual-port 4 Gbps FC mezzanine card	411419–B21	405920–001N	405920–001

Table 29 CRU List *(continued)*

Description	Manufacturing Part Number	Replacement Part Number	Exchange Part Number
Direct adapter mezzanine card for connecting to the direct attach storage blade	431644–B21	436010–001N	463010–001
Dual-port 4x InfiniBand mezzanine card	410533–B21	410500–001N	410500–001
HPC 4x DDR IB mezzanine HCA	406855–001	410500–001N	410500–001
HP HPDC 4x DDR IB Cisco mezzanine HCA	438760-B21	410500–001N	410500–001
SPS-Mod BLSYS ENet 1 GB / 10 GB	399593-B22		399725–001
SPS-Port Aggregator FC 20 port	409153-B21		410152–001
HP Smart Array P700m/512 Battery Option Kit	383280–B21		
HP Smart Array P700M/512 Controller, no battery	508226–B21		
Smart Array P-Series Low Profile Battery Kit	452348-B21		
Cables			
Local I/O cable (SUV)	409496–001	416003–001	
CPU MVR cable	AD217–2004A	AD217–2004A	
Miscellaneous			
Air baffle, CPU	AD217–3404B	AD217–3404B	
Air baffle, zx2 controller	AD217–3410A	AD217–3410A	
Chassis plug, rear	AD217–3411B	AD217–3411B	
Top cover, chassis	AD217–2105B	AD217–2105B	
TPM module	314581–003	406059–001	
Server battery 3 V .22 A HR LI manganese dioxide (CR2032)	1420-0356	1420-0356	
SPS-DRV DVD+R/RW 2x/2x MBII PA		375557–001	375557–0012

B Server Upgrades

This appendix provides information for upgrading processors.

Processor Upgrades

The HP Integrity BL860c server blade supports upgrades from Intel Itanium Montecito to Intel Itanium Montvale processors.

CAUTION: Ensure that processor speed and cache size are identical for all processors. Failure to observe this caution results in performance degradation or system failure.

To ensure compatibility, use processors with identical part numbers.

Table 30 lists the processor upgrades that are supported, and required system firmware levels for each server.

Table 30 Processor Upgrades

Manufacturing Part Number	Processor	System Firmware Level
HP Integrity BL860c server blade		
AD394-2101C	1.42 GHz / 12 MB	greater than 01.01
AD395-2102C	1.6 GHz / 6 MB	
AD396-2101C	1.67 GHz / 18 MB	

Upgrading Versus Adding On

If your HP Integrity server already contains one, or more, of the processors listed in Table 30, follow the processor removal and replacement procedures (see "Removing and Replacing a Processor" (page 115)) to add another processor. Updating the system firmware and OS is unnecessary when adding another processor.

If your HP Integrity server does not currently contain one, or more, of the processors listed in Table 30, then a server upgrade is being performed, and system firmware and OS updates may be necessary. After any necessary system firmware and OS updates are performed, follow the processor removal and replacement procedures (see "Removing and Replacing a Processor" (page 115)).

Firmware

Before upgrading the processor, ensure the server is at the required system firmware level. Check the system firmware version by executing the `info fw` command at the EFI Shell prompt.

NOTE: HP recommends using the latest version of firmware.

Go to http://www.hp.com/support/itaniumservers to download firmware updates.

Operating Systems

IMPORTANT: Check the HP Support Center (HPSC) website at http://www.hp.com/go/hpsc for any required OS patches.

HP-UX

HP-UX supports the processor upgrade at the following minimum release levels:

- HP-UX 11.23 0706
- HP-UX 11.31 0709

OpenVMS

OpenVMS must be upgraded to OpenVMS V8.3-1H1 to support the processor upgrade.

Windows

Windows® supports the processor upgrade.

Linux

Linux supports the processor upgrade. If you choose to move any I/O cards or storage during this upgrade, Linux must be reinstalled.

C Utilities

This appendix describes the utilities that are part of the server blade. These include the EFI Boot Manager and EFI-POSSE.

NVRAM Backup Utility

The HP Integrity Non-Volatile RAM (NVRAM) configuration backup utility provides the capability to store and restore critical server settings and EFI Boot Manager options on the server blade. This utility is available as an offline EFI application.

Downloading and Installing the NVRAM Backup Utility

To download and install the NVRAM backup utility onto your server:

1. Connect to the HP Support & Drivers home pages at: http://welcome.hp.com/country/us/en/support.html.
2. Select **Download drivers and software**.
3. Enter the server model number (**BL860c**) and click **>>** to begin the search.
4. Select the configuration of your server.
5. Select the operating system (**HP-UX 11.x**).
6. Select **Utility** from the Quick jump list.
7. Select the following utility in the list:

   hp Integrity Non-Volatile RAM Configuration Backup Utility.
8. Select the **Release Notes** tab to view the release notes with the installation instructions.
9. Click **Download**, then **Save**, and select a directory to save the utility package to. The utility package downloads to the directory you selected.

Using the NVRAM Backup Utility

The following shows the options you can enter when using the NVRAM backup utility.

Syntax

```
nvrambkp [-h|-b|-r <archivedb>|-a <archivedb>|-o|-n|-v|-i|-l <log>]
```

Parameters

-h	Displays help text
-b	Enables paging text (only allowed with -h)
-r <*archivedb*>	Restores all nonvolatile settings from the archived database
-a <*archivedb*>	Archives all nonvolatile settings to the archive database
-o	Restores EFI Boot Manager options only (use only with -r)
-n	Non-interactive mode, no user prompt
-v	Validates the database that used on the server
-i	Database information
-l <log>	Creates a log file

Example 1 nvrambkp -h

```
Hewlett-Packard (R) IPF Non-Volatile Configuration Back-up Utility
Version 01.03.01

Copyright (C) Hewlett-Packard. All rights reserved.

Usage:

Purpose:
   The application provides the capability to archive & restore
   critical system settings.

Options:
   -h - Display the help text
   -b - Enable paging text [Only works with -h]
   -r - Restore all the Non-Volatile settings from the <restore database>
        The -r option is not allowed with -a option
   -a - Archive all the Non-Volatile settings to the <archive database>
        The -a option is not allowed with -r option
   -o - Restore the EFI Boot Manager options only
        The -o option is only allowed with -r option
   -n - Non-interactive mode; User will not be prompted
   -v - Validate that the database can be used on the system
   -i - Information about the database
   -l - Log file


Help:
   nvrambkp -h

Archive:
   nvrambkp [-n] [-a <archive database>] [-l <log file>]

Restore All:
   nvrambkp [-n] [-r <restore database>] [-l <log file>]

Restore Boot-Options Only:
   nvrambkp -o [-n] [-r <restore database>] [-l <log file>]

Restore Database Validate:
   nvrambkp -v [-r <restore database>] [-l <log file>]

Restore Database Information:
   nvrambkp -i [-r <restore database>] [-l <log file>]
```

Extensible Firmware Interface

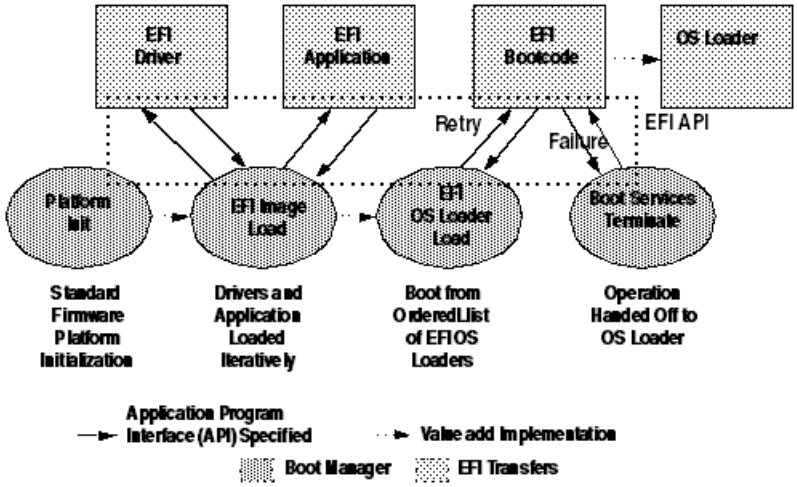
The Extensible Firmware Interface (EFI) is an OS and platform-independent boot and preboot interface. EFI resides between the OS and platform firmware, allowing the OS to boot without having details about the underlying hardware and firmware. EFI supports boot devices, uses a flat memory model, and hides platform and firmware details from the OS.

NOTE: EFI and Pre-OS System Environment (POSSE) are similar. EFI is an Intel specification, whereas POSSE is the HP implementation that aids HP support.

EFI consolidates boot utilities similar to those found in PA-RISC based servers, such as the Boot Console Handler (BCH), and platform firmware into a single platform firmware. EFI allows the selection of any EFI OS loader from any boot medium that is supported by EFI boot services. An EFI OS loader supports multiple options on the user interface.

EFI supports booting from media that contain an EFI OS loader or an EFI-defined server partition. An EFI-defined system partition is required by EFI to boot from a block device.

Figure 83 EFI Boot Sequence



The EFI boot manager loads EFI applications (including the OS first stage loader) and EFI drivers from an EFI-defined file system or image loading service. Non-volatile RAM (NVRAM) variables point to the file to be loaded. These variables contain application-specific data that is passed directly to the EFI application. EFI variables provides system firmware a boot menu that points to all the operating systems, even multiple versions of the same operating systems.

The EFI boot manager allows you to control the server's booting environment. Depending on how you have configured the boot options, after the server is powered up the boot manager presents you with different ways to bring up the server. For example, you can boot to the EFI Shell, to an operating system located on the network or residing on media in the server, or the Boot Maintenance menu. See "Using the Boot Option Maintenance Menu" (page 174) for more information.

- *Boot from a File*— Automatically adds EFI applications as boot options or allows you to boot from a specific file. When you choose this option, the server searches for an EFI directory. If the EFI directory is found, then it looks in each of the subdirectories below EFI. In each of those subdirectories, it looks for the first file that is an executable EFI application. Each of the EFI applications that meet this criterion can be automatically added as a boot option. In addition, legacy boot options for A: and C: are also added if those devices are present. You can also launch a specific application without adding it as a boot option. In this case the EFI boot manager searches the root directories and the \EFI\TOOLS directories of all of the EFI system partitions present in the server for the specified EFI application.
- *Add a Boot Option*— Adds a boot option to the EFI boot manager. You specify the option by providing the name of the EFI application. Along with the name you can also provide either ASCII or UNICODE arguments the file might use. Given the EFI application name and any options, the EFI boot manager searches for the executable file in the same directories as described in the Boot from a File option. When the file is found, it is issued.
- *Delete Boot Options* – Deletes a specific boot option or all boot options.
- *Change Boot Order* – Controls the relative order in which the EFI boot manager attempts boot options. For help on the control key sequences you need for this option, see the help menu.
- *Manage BootNext Setting* – Selects a boot option to use one time (the next boot operation).
- *Set Automatic Boot Timeout* – Defines the value in seconds that pass before the server automatically boots without user intervention. Setting this value to zero disables the timeout feature.
- *Exit* – Returns control to the EFI boot manager main menu. This displays the active boot devices, including a possible integrated shell (if the implementation is so constructed).

EFI Commands

Table 31 lists EFI commands for the server blade, and the equivalent BCH commands for reference.

Table 31 EFI Commands

EFI Shell Command	BCH Command Equivalent (PA-RISC)	BCH Command Parameters (PA-RISC)	Definition
These commands are found in all other menus			
info boot	Boot	[PRI|HAA|ALT|<path>]	Boot from specified path
help <command>	HElp	[<menu>|<command>]	Display help for specified command or menu
reset	RESET		Reset the server (to allow reconfiguration of complex)
exit (at EFI Shell)	MAin		Return to the main menu
MAin			
EFI boot manager "change boot order"	PAth	[PRI|HAA|ALT|CON|KEY|<path>]	Display or modify a path
bcfg	SEArch	[ALL]	Search for boot devices
bcfg	SEArch	[DIsplay|IPL] [<path>]	Search for boot devices
many commands offer a [-b] parameter to cause 25 line breaks	ScRoll	[ON|OFF]	Display or change scrolling capability
COnfiguration			
autoboot	AUto	[BOot|SEarch|STart] [ON|OFF]	Display or set the auto start flag
info boot	BootID	[<processor #>[<bootid #>]]	Display or set processor boot identifier
EFI boot manager	Boot info		Display boot-related information
autoboot	BootTimer	[0-200]	Seconds allowed for boot attempt
cpuconfig	CPUconfig	[<proc>][ON|OFF]]	Config/deconfig processor
conconfig	Console config	[index][ON|OFF|primary]	Config primary console
ioconfig	IOCONFIG	IOCONFIG [fast_init | mps_optimize | wol [on | off]]	Deconfigure or reconfigure I/O components or settings
boottest	FastBoot	[ON|OFF] or [test] [RUN|SKIP]	Display or set boot tests execution
date	Time	[cn:yr:mo:dy:hr:mn[:ss]]	Read or set the date
time	Time	[cn:yr:mo:dy:hr:mn[:ss]]	Read or set the real time clock
INformation			
info all	ALL		Display all server information
info boot	BootINfo		Display boot-related information
info cpu	CAche		Display cache information
info chiprev	ChipRevisions		Display revision number of major VLSI
iLO 2 MP command <df>	FRU		Display FRU information
info fw	FwrVersion		Display firmware version for PDC, ICM, and complex

Table 31 EFI Commands *(continued)*

EFI Shell Command	BCH Command Equivalent (PA-RISC)	BCH Command Parameters (PA-RISC)	Definition
info io	IO		Display firmware version for PDC, ICM, and complex
lanaddress	LanAddress		Display core LAN station address
info mem	Memory		Display memory information
info cpu	PRocessor		Display processor information
SERvice			
errdump clear	CLEARPIM		Clear (zero) the contents of PIM
mm	MemRead	<addr> [<len>] [<type>]	Read memory locations scope of page deallocation
pdt	page deallocation table (pdt)		Display or clear the page deallocation table
errdump mca errdump cmc errdump init errdump cpe	processor internal memory (PIM)	[<proc>] [HPMC|LPMC|TOC|ASIC]]	Display PIM information

EFI/POSSE Commands

This section describes the EFI/POSSE commands developed for the server.

NOTE: EFI and Pre-OS System Environment (POSSE) are similar. EFI is an Intel specification, whereas POSSE is the HP implementation that aids HP support.

Help

Provides information on the EFI Shell commands. It also has an additional feature to aid those familiar with the BCH menus to adjust to their equivalent functions in EFI.

Syntax

```
help [-b] <category>
help [-b] <cmd>
help [-b] bch <bchmenu> <bchcmd>
```

Parameters

```
-b              Enable page breaking
category        Category of commands to view help on commands
cmd             Shell command name on which to provide verbose information
bch             Display the list of BCH commands and their corresponding EFI
bchmenu         BCH menu name taken from the top level of the BCH menu
bchcmd          BCH command on which to display information
```

Operation

If help is invoked with no parameters, a list of shell command categories displays. To list all of the commands within a category, enter **`help <category>`** (see examples). If invoked with the `-b` switch, any output longer than one page pauses after each page displays. If a shell command name is used as a parameter, verbose help displays for that command.

If help is invoked with the `bch` option, it displays a list of BCH commands and their corresponding EFI/POSSE commands. It instructs you to repeat the command line followed by a menu name for more information on that menu. If help is invoked followed by `bch` and a menu name, it displays

a list of commands that appear under that BCH menu. You can then invoke help followed by `bch`, the menu name, and a BCH command name to display information on that command. This points you to the command that has taken the place of that BCH functionality, or will inform you that the functionality no longer exists. As a shortcut, enter `help` followed by `bch` and a BCH command name to go straight to that command.

Example 2 help Command

```
Shell> help
List of classes of commands:

boot          -- Booting options and disk-related commands
configuration -- Changing and retrieving system information
devices       -- Getting device, driver and handle information
memory        -- Memory related commands
shell         -- Basic shell navigation and customization
scripts       -- EFI shell-script commandsType "help" followed by a
             class name for a list of commands in that class
Type "help" followed by command name for full documentation
```

Example 3 help bch Command

```
    COnfiguration         help bch co
    INformation           help bch in
    PAth                  help bch pa
    ScRool                help bch sr
    SEArch                help bch sea
    SERvice               help bch ser
    BOot                  help bch bo
    HElp                  help bch he
    RESET                 help bch reset
    MAin                  help bch ma

    For more help on one of the commands above, at the prompt type:
        help bch COMMAND
```

Example 4 help configuration Command

```
Shell> help configuration
Configuration commands:

cpuconfig  -- Deconfigure or reconfigure cpus
date       -- Display or set date
err        -- Display or set error level
esiproc    -- Make an ESI call
errdump    -- View/Clear logs
info       -- Display hardware information
monarch    -- View or set the monarch processor
palproc    -- Make a PAL call
salproc    -- Make a SAL call
time       -- Display or set time
ver        -- Displays version info

Type "help" followed by command name for full documentation that command.
Type "help -a" to display a list of all commands.
```

Example 5 help cpuconfig Command

```
Shell> help cpuconfig

CPUCONFIG [cpu] [on|off]

   cpu    Specifies which cpu to configure
   on|off Specifies to configure or deconfigure a cpu

   Notes:
        1. Cpu status will not change until next boot

   Examples:
       * To deconfigure CPU 0
       fs0:\> cpuconfig 0 off
       CPU will be deconfigured on the next boot

       * To display configuration status of cpus
       fs0:\> cpuconfig
       <CPU configuration data displayed>
```

baud

Sets the baud rate and communication settings for a universal asynchronous receiver-transmitter (UART).

Syntax

```
baud <index> <baudrate>
```

Parameters

```
<index> 0 through the total number of UARTS minus one
<baudrate>      baud rate.
```

Operation

Use this command to change the speed for a UART in the server. This command works for all UARTs visible to EFI/POSSE. If the UART is part of processor dependent hardware (PDH) space and is initialized by the core firmware, this command communicates the settings to core firmware so the UART can be initialized with the new settings on the next boot. System default is 9600 baud.

Other Communication parameters are listed in Table 32.

Table 32 Communications Parameters

Parameter	Value
RECEIVE_FIFO_DEPTH	1
TIMEOUT	1000000
PARITY	No parity
DATA_BITS	8
STOP_BITS	1
CONTROL_MASK	0

boottest

Interacts with the speedy boot variable allowing it to be set appropriately.

Syntax

```
boottest                        Displays status of all speedy boot bits
boottest on                     Run all tests (for a normal boot time)
```

```
bootest off                    Skip all tests (for a faster boot time)
bootest [test]                 Displays status of specific Speedy Boot bit
bootest [test] [on|off]        Sets or clears a specific Speedy Boot bit
```

Parameters

```
[test]  Each test can be set or cleared:
        booting_valid   Enable/disable system firmware response to BOOTING
                        bit. If OS Speedy Boot aware set to on.
        early_cpu       Enable/disable early CPU selftests.
        late_cpu        Enable/disable late CPU selftests.
        platform        Enable/disable system board hardware tests.
        chipset         Enable/disable CEC tests.
        io_hw           Enable/disable EFI driver Core I/O tests.
        mem_init        Enable/disable memory initialization.
        mem_test        Enable/disable full destructive memory tests.
```

Example 6 boottest Command

```
Shell> boottest
   BOOTTEST Settings Default Variable
   Selftest         Setting
   -------------    -------------------------
   booting_valid    On (OS speedy boot aware)
   early_cpu        Run this test
   late_cpu         Run this test
   platform         Run this test
   chipset          Run this test
   io_hw            Run this test
   mem_init         Run this test
   mem_test         Run this test
```

Example 7 boottest early_cpu off Command

```
Shell> boottest early_cpu off
   BOOTTEST Settings Default Variable
   Selftest         Setting
   -------------    -------------------------
   booting_valid    On (OS speedy boot aware)
   early_cpu        Skip this test
   late_cpu         Run this test
   platform         Run this test
   chipset          Run this test
   io_hw            Run this test
   mem_init         Run this test
   mem_test         Run this test
```

cpuconfig

Use this command to display the configured or deconfigured state of processors in the server. This command also enables you to configure or reconfigure processors.

Syntax

```
cpuconfig <cpu> <on|off>
```

Parameters

```
<cpu>           specify a processor
<on|off>        state to set the processor to
```

Operation

Issuing `cpuconfig` with no parameters displays the config/deconfig status of all processors. A user can reconfigure processors by specifying a processor number and a state (on or off). If a valid

state is entered and is different from the current state of a processor, its status changes on the next boot. The last remaining configured processor in a server cannot be deconfigured.

Example 8 cpuconfig Command

```
Shell>  cpuconfig
PROCESSOR INFORMATION
       # of                 L3      L4      Family/
CPU    Logical              Cache   Cache   Model            Processor
Slot   CPUs       Speed     Size    Size    (hex.)  Rev        State
---   -------    ---------  ----    -----   ------   ----    ----------
 0      1        1 GHz      1.5 MB   None    1F/01    B1       Active
 1      1        1 GHz      1.5 MB   None    1F/01    B1       Active
```

Example 9 cpuconfig 2 Command

```
Shell> cpuconfig 2 off
CPU will be deconfigured on next boot.

Shell> cpuconfig
PROCESSOR INFORMATION
       # of                 L3     L4      Family/
CPU     Logical             Cache  Cache   Model            Processor
Slot    CPUs       Speed    Size   Size    (hex.)   Rev       State
---   -------    ---------   ----   -----   ------   ----    ----------
 0       1          1 GHz    3 MB   None    1F/00    B2       Active
 1       1          1 GHz    3 MB   None    1F/00    B2       Sched Deconf
```

conconfig

Use this command to configure the primary console, and turn other consoles on for mirroring from the firmware.

Syntax

```
conconfig [index][on|off|primary]
```

Parameters

```
Index        Specifies index of console to set as primary
on           Enables the specified console as a secondary console
off          Puts console into "Not Configured" (NC) state
primary      Sets the specified console as primary
```

Notes

1. Primary console setting will take effect after reboot
2. P in status column indicates console is primary
3. S in status column indicates console is secondary
4. NC in status column indicates console is not configured
5. If a disabled console is set to primary it will be enabled

Example 10 conconfig Command

To display current primary operating system console

```
Shell> conconfig
CONSOLE CONFIGURATION
Index Status Type     Device Path
----- ------ ----     -----------
1      NC    Serial   Acpi(PNP0501,0)
2      S     Serial   Acpi(HWP0002,0)/Pci(1|1)
3      P     VGA      Acpi(HWP0002,0)/Pci(4|0)
```

Example 11 conconfig 2 primaryCommand

To change primary operating system console

```
Shell> conconfig 2 primary
CONSOLE CONFIGURATION
 Index Status Type     Device Path
 ----- ------ ----     -----------
 1       NC  Serial    Acpi(PNP0501,0)
 2       P   Serial    Acpi(HWP0002,0)/Pci(1|1)
 3       S   VGA       Acpi(HWP0002,0)/Pci(4|0)
```

Example 12 conconfig 3 offCommand

To disable a console

```
Shell> conconfig 3 off
CONSOLE CONFIGURATION
Index Status Type     Device Path
 ----- ------ ----     -----------
 1      NC    Serial   Acpi(PNP0501,0)
 2      P     Serial   Acpi(HWP0002,0)/Pci(1|1
 3      NC    VGA      Acpi(HWP0002,0)/Pci(4|0)
```

Example 13 conconfig 3 onCommand

To enable a console

```
Shell> conconfig 3 on
CONSOLE CONFIGURATION
Index Status Type     Device Path
 ----- ------ ----     -----------
 1      NC    Serial   Acpi(PNP0501,0)
 2      P     Serial   Acpi(HWP0002,0)/Pci(1|1)
 3      S     VGA      Acpi(HWP0002,0)/Pci(4|0)
```

default

Enables you to restore nonvolatile memory (NVM) to default values and clear NVM storage values.

Syntax

```
default     [efi|sal]
default     clear [bmc|efi|sal]
```

Parameters

```
clear      clears NVM storage values
```

Operation

Default sets NVM and stable store values to predefined default values. To the normal user only a subset of values are available for default. Executing **`default clear`** resets the server.

errdump

Displays the contents of processor internal memory logged on the first machine check abort (MCA) for all processors present in the server.

Syntax

```
errdump [mca | cpe | cmc | init | la | clear]
```

Parameters

```
mca                dumps the Machine Check Abort error log
cpe                dumps the Corrected Platform Error log
cmc                dumps the Corrected Machine Check log
init               dumps the Initialization log
la                 dumps the Logic Analyzer log
clear              erases all of the logs (mca, cpe, cmc, init, la)
```

Operation

If a user enters no parameters, the usage is displayed. Otherwise, the specified error log displays. Adding -n to the clear parameter disables the confirmation prompt (Access the `errdump`command from the System Configuration menu).

info

Displays most server information.

Syntax

```
info [ -b] [target]
```

Parameters

```
target:          valid targets are:
        all         display everything
        cpu         display information on cpus
        cache       display information on cache
        mem         display information on memory
        io          display information on io
        boot        display boot-related information
        chiprev       display information on chip revisions
        fw          display firmware version information
        sys         display system information
        warning     display warning and stop boot information
```

Example 14 info all Command

```
Shell> info all

SYSTEM INFORMATION

Date/Time:  Oct 31, 2003  22:03:39  (20:03:10:31:22:03:39)
Manufacturer:  hp
Product Name:  server BL860c
Product Number:  A9901A
Serial Number:  MYJ3350026
UUID:  48B4F371-E34C-11D6-A8D6-07A8C14CB68B
System Bus Frequency:  200 MHz

PROCESSOR MODULE INFORMATION

        # of                L3      L4      Family/
   CPU  Logical             Cache   Cache   Model          Processor
   Slot CPUs     Speed      Size    Size    (hex.)   Rev   State

   ---- -------  --------   ------  ------  -------  ---   ------------
     0      1        1 GHz  1.5 MB    None   1F/01    B1        Active
     1      1        1 GHz  1.5 MB    None   1F/01    B1        Active

MEMORY INFORMATION

     ---- DIMM A -----  ---- DIMM B -----
      DIMM   Current     DIMM   Current
---  ------ ----------  ------ ----------
 0   1024MB     Active  1024MB     Active
 1    ----               ----
 2    ----               ----
 3    ----               ----
   Active Memory    : 2048 MB
   Installed Memory : 2048 MB

I/O INFORMATION

BOOTABLE DEVICES

   Order  Media Type  Path
   -----  ----------  ------------------------------------
   Seg  Bus  Dev  Fnc  Vendor  Device Slot
    #    #    #    #     ID      ID     #   Path
   ---  ---  ---  ---  ------  ------  ---  -----------
    00   00   01   00  0x1033  0x0035   XX  Acpi(HWP0002,0)/Pci(1|0)
    00   00   01   01  0x1033  0x0035   XX  Acpi(HWP0002,0)/Pci(1|1)
    00   00   01   02  0x1033  0x00E0   XX  Acpi(HWP0002,0)/Pci(1|2)
    00   00   02   00  0x1095  0x0649   XX  Acpi(HWP0002,0)/Pci(2|0)
    00   00   03   00  0x8086  0x1229   XX  Acpi(HWP0002,0)/Pci(3|0)
    00   20   01   00  0x1000  0x0030   XX  Acpi(HWP0002,100)/Pci(1|0)
    00   20   01   01  0x1000  0x0030   XX  Acpi(HWP0002,100)/Pci(1|1)
    00   20   02   00  0x14E4  0x1645   XX  Acpi(HWP0002,100)/Pci(2|0)

BOOT INFORMATION

   Monarch CPU:
   Current  Preferred
   Monarch   Monarch   Possible Warnings
   -------  ---------  -----------------
         0          0
   AutoBoot: OFF - Timeout is disabled
   Boottest:
   BOOTTEST Settings Default Variable
   OS is not speedy boot aware.
```

```
   Selftest     Setting
   ---------    --------------
   early_cpu    Run this test
   late_cpu     Run this test
   platform     Run this test
   chipset      Run this test
   io_hw        Run this test
   mem_init     Run this test
   mem_test     Run this test

LAN Address Information:

   LAN Address        Path
   -----------------  ---------------------------------------
   Mac(00306E4C4F1A)  Acpi(HWP0002,0)/Pci(3|0)/Mac(00306E4C4F1A))
  *Mac(00306E4C0FF2)  Acpi(HWP0002,100)/Pci(2|0)/Mac(00306E4C0FF2))

FIRMWARE INFORMATION

   Firmware Revision: 1.10 [4341]
   PAL_A Revision: 7.31/5.37
   PAL_B Revision: 5.37
   SAL Spec Revision: 3.01
   SAL_A Revision: 2.00
   SAL_B Revision: 1.10
   EFI Spec Revision: 1.10
   EFI Intel Drop Revision: 14.61
   EFI Build Revision: 1.10
   POSSE Revision: 0.10
   ACPI Revision: 7.00
   BMC Revision: 2.24
   IPMI Revision: 1.00
   SMBIOS Revision: 2.3.2a
   Management Processor Revision: E.02.25

WARNING AND STOP BOOT INFORMATION

CHIP REVISION INFORMATION

   Chip                  Logical     Device       Chip
   Type                     ID         ID       Revision
   -------------------   -------     ------     --------
   Memory Controller         0       122b         0023
   Root Bridge               0       1229         0023
     Host Bridge          0000       122e         0032
     Host Bridge          0001       122e         0032
     Host Bridge          0002       122e         0032
     Host Bridge          0004       122e         0032
     Other Bridge            0          0         0002
     Other Bridge            0          0         0007
     Baseboard MC            0          0         0224
```

Example 15 info cpu Command

```
Shell> info cpu

PROCESSOR MODULE INFORMATION

       # of                 L3      L4      Family/
   CPU Logical              Cache   Cache   Model          Processor
   Slot CPUs     Speed      Size    Size    (hex.)   Rev   State
   ---- -------  --------   ------  ------  -------  ---   ------------
     0      1        1 GHz  1.5 MB    None   1F/01    B1         Active
     1      1        1 GHz  1.5 MB    None   1F/01    B1         Active
```

Example 16 info mem Command

```
Shell> info mem

MEMORY INFORMATION

     ---- DIMM A -----  ---- DIMM B -----
      DIMM   Current     DIMM   Current
---  ------ ----------  ------ ----------
 0   1024MB     Active  1024MB     Active
 1    ----                ----
 2    ----                ----
 3    ----                ----
   Active Memory    : 2048 MB
   Installed Memory : 2048 MB
```

Example 17 info io Command

```
I/O INFORMATION

BOOTABLE DEVICES


   Order  Media Type  Path
   -----  ----------  ------------------------------------
     1    CDROM       Acpi(HWP0002,0)/Pci(2|0)/Ata(Primary,Master)/CDROM(Entry0)

   Seg  Bus  Dev  Fnc  Vendor  Device Slot
    #    #    #    #     ID      ID     #   Path
   ---  ---  ---  ---  ------  ------  ---  -----------
    00   00   01   00  0x1033  0x0035   XX  Acpi(HWP0002,0)/Pci(1|0)
    00   00   01   01  0x1033  0x0035   XX  Acpi(HWP0002,0)/Pci(1|1)
    00   00   01   02  0x1033  0x00E0   XX  Acpi(HWP0002,0)/Pci(1|2)
    00   00   02   00  0x1095  0x0649   XX  Acpi(HWP0002,0)/Pci(2|0)
    00   00   03   00  0x8086  0x1229   XX  Acpi(HWP0002,0)/Pci(3|0)
    00   20   01   00  0x1000  0x0030   XX  Acpi(HWP0002,100)/Pci(1|0)
    00   20   01   01  0x1000  0x0030   XX  Acpi(HWP0002,100)/Pci(1|1)
    00   20   02   00  0x14E4  0x1645   XX  Acpi(HWP0002,100)/Pci(2|0)
    00   40   01   00  0x1000  0x0021   02  Acpi(HWP0002,200)/Pci(1|0)
    00   40   01   01  0x1000  0x0021   02  Acpi(HWP0002,200)/Pci(1|1)
    00   80   01   00  0x14E4  0x1645   01  Acpi(HWP0002,400)/Pci(1|0)
    00   E0   01   00  0x103C  0x1290   XX  Acpi(HWP0002,700)/Pci(1|0)
    00   E0   01   01  0x103C  0x1048   XX  Acpi(HWP0002,700)/Pci(1|1)
    00   E0   02   00  0x1002  0x5159   XX  Acpi(HWP0002,700)/Pci(2|0)
```

Example 18 info boot Command

```
Shell> info boot

BOOT INFORMATION

   Monarch CPU:
     Current  Preferred
     Monarch   Monarch    Possible Warnings
    --------  ---------   ------------------
            0           0
   AutoBoot: on - Timeout is : 7 SEC
   Boottest:
   boottest  Settings Default Variable
   OS is not speedy boot aware.

    Selftest       Setting
   ----------      --------------
    early_cpu      Skip this test
    late_cpu       Run this test
    platform       Run this test
    chipset        Run this test
    io_hw          Run this test
    mem_init       Run this test
    mem_test       Run this test
```

ioconfig

Use this command to deconfigure or reconfigure I/O components or settings.

Syntax

```
ioconfig <fast_init | mps_optimize | wol> <on | off>
```

Parameters

```
<fast_init>    specifies device connection policy setting
<mps_optimize> specifies PCIe MPS optimization setting
<wol>          specifies system wake-on-lan setting
<on | off>      specifies to configure or deconfigure a feature or component
```

Operation

The `ioconfig` file is used to retain information on system's I/O configuration across reboots. The `ioconfig` file is created by `insf` at install time; and is modified by `insf`, `rmsf`, and `ioscan` when devices are added or removed. The only purpose of the `ioconfig` file to maintain configuration information when the system is not running.

Example 19 ioconfig command

```
Shell> ioconfig
Deconfigure or reconfigure IO components or settings

IOCONFIG [fast_init | wol [on | off]]

fast_init  Specifies device connection policy setting
mps_optimize Specifies PCIe optimization setting
wol        Specifies System Wake-On-LAN setting
on | off    Specifies to configure or deconfigure a feature or component

Note:
   1. If fast_init is enabled, firmware will connect only the minimum set of
      devices during boot.  This feature might cause boot failure; disable this
      feature if failure occurs.

   2. A reboot is required for PCIe MPS optimization changes to take effect

   3. Any pending Wake-On-LAN request will not be cleared until reboot if
      the setting is changed to disabled.

      System will clear pending Wake-On-LAN requests each time the system
      reboots if the setting is disabled.

Examples:
  * To display the current settings
    fs0:\> ioconfig
    Fast initialization: Enabled
    MPS optimization:    Disabled
    System Wake-On-LAN:  Disabled

  * To display the current device connection policy setting
    fs0:\> ioconfig fast_init
    Fast initialization: Enabled

  * To disable fast initialization
    fs0:\> ioconfig fast_init off
    Fast initialization: Disabled

  * To enable the System Wake-On-LAN setting
    fs0:\> ioconfig wol on
    System Wake-On-LAN: Enabled
```

lanaddress

Enables you to display the core I/O MAC address.

Syntax:

```
lanaddress
```

Parameters

none

Example 20 lanaddress Command

```
LAN Address Information:

   LAN Address        Path
   -----------------  ---------------------------------------
   Mac(00306E4C4F1A)  Acpi(HWP0002,0)/Pci(3|0)/Mac(00306E4C4F1A))
  *Mac(00306E4C0FF2)  Acpi(HWP0002,100)/Pci(2|0)/Mac(00306E4C0FF2))
```

monarch

Displays or modifies the ID of the bootstrap processor. The preferred monarch number is stored in NVM.

Syntax

```
monarch <cpu>
```

Parameters

```
<cpu>      specifies a cpu
```

Operation

If specified with no parameters, `monarch` displays the Monarch processor for the server. Specifying a processor number alters the preferred Monarch processor. None of these changes takes affect until after a reboot.

Example 21 monarch Command

```
Shell> monarch
 Current   Preferred
 Monarch    Monarch     Possible Warnings
 -------   ---------    -----------------
       0           0
       0           0

To view monarch: fs0 :\ monarch

                  | Processor
------------------+-----------
current status    |    0
next boot status  |    0

To set the monarch processor to 1: fs0 :\ monarch 1

                  | Processor
------------------+-----------
current status    |    0
next boot status  |    1
```

pdt

Displays or clears the contents of the Page Deallocation Table.

Syntax

```
pdt (clear)
```

Parameters

```
<clear>      clears the pdt
```

Operation

With no options specified, the command displays the PDT information for the server. The PDT is cleared and a reboot is required for memory reallocation and safe booting.

Example 22 pdt Command

```
Shell> pdt
PDT Information

                Last Clear time: PDT has not been cleared
       Number of total entries in PDT:                 50
        Number of used entries in PDT:                  0
        Number of free entries in PDT:                 50
  Number of single-bit entries in PDT:                  0
   Number of multi-bit entries in PDT:                  0
     Address of first multi-bit error:  x0000000000000000
```

Example 23 pdt clear Command

```
Shell> pdt clear
Are you sure you want to clear the PDT? [y/N] y
Shell>

Shell> pdt
PDT Information

                Last Clear time: 10/21/01  5:00p
       Number of total entries in PDT:                 50
        Number of used entries in PDT:                  0
        Number of free entries in PDT:                 50
  Number of single-bit entries in PDT:                  0
   Number of multi-bit entries in PDT:                  0
     Address of first multi-bit error: 0x0000000000000000
```

sysmode

Display or modify the system mode.

Syntax

```
sysmode <normal | admin| service>
```

Parameters

```
<normal>     sets system mode to normal

<admin>      sets system mode to admin

<service>    sets system mode to service
```

Operation

If specified alone, `sysmode` displays the system mode. If a mode is specified as a parameter, then the system mode is changed. This new mode takes effect immediately. The system mode is retained on successive boots. Interaction with `sysmode` in a variety of scenarios is outlined below.

Example 24 sysmode Command

```
Shell> sysmode
System Mode: NORMAL

Shell> sysmode admin
You are now in admin mode.

Shell> sysmode service
You are now in service mode.

Shell> sysmode normal
You are now in normal mode
```

Specifying Parameters

The following parameters can be configured for the board:

- ID (initiator ID)
- Maximum data transfer rate (rate)
- Bus width
- Whether the HBA is bootable (driver support)
- Avoid bus resets (secondary cluster server)

Using the Setup Utility

To use the `setup` utility:

1. To map the parameters for all PCI cards installed in the server, enter the `info io` command at the EFI Shell prompt.

   A list of all the devices that are installed in the server blade and managed by EFI drivers displays. The output displays as follows:

```
Seg  Bus  Dev  Fnc  Vendor  Device Slot
 #    #    #    #     ID      ID     #   Path
---  ---  ---  ---  ------  ------  ---  -----------
 00   00   01   00  0x1033  0x0035   XX  Acpi(HWP0002,0)/Pci(1|0)
 00   00   01   01  0x1033  0x0035   XX  Acpi(HWP0002,0)/Pci(1|1)
 00   00   01   02  0x1033  0x00E0   XX  Acpi(HWP0002,0)/Pci(1|2)
 00   00   02   00  0x1095  0x0649   XX  Acpi(HWP0002,0)/Pci(2|0)
 00   00   03   00  0x8086  0x1229   XX  Acpi(HWP0002,0)/Pci(3|0)
 00   20   01   00  0x1000  0x0030   XX  Acpi(HWP0002,100)/Pci(1|0)
 00   20   01   01  0x1000  0x0030   XX  Acpi(HWP0002,100)/Pci(1|1)
 00   20   02   00  0x14E4  0x1645   XX  Acpi(HWP0002,100)/Pci(2|0)
 00   40   01   00  0x1000  0x0021   02  Acpi(HWP0002,200)/Pci(1|0)
 00   40   01   01  0x1000  0x0021   02  Acpi(HWP0002,200)/Pci(1|1)
 00   80   01   00  0x14E4  0x1645   01  Acpi(HWP0002,400)/Pci(1|0)
 00   E0   01   00  0x103C  0x1290   XX  Acpi(HWP0002,700)/Pci(1|0)
 00   E0   01   01  0x103C  0x1048   XX  Acpi(HWP0002,700)/Pci(1|1)
 00   E0   02   00  0x1002  0x5159   XX  Acpi(HWP0002,700)/Pci(2|0)
```

   In the example above, a single interface is shown in the listing. The information for both channels of the interface is shown in **bold**, for highlighting purposes.

   For each channel of the board, you need to note certain information. As an example, look at the information for the interface (the first two bold lines). For each channel of *this* interface, note the following information:

   - `Bus #`—identifies the bus the device is on; for the interface, this is the same for both channels. In this example, the bus number is `20`.
   - `Dev #`—the ID the device is assigned on the bus; for the interface, this is the same for both channels. In this example, the interface is device `01`.
   - `Fnc #`—identifies the channel of the device (`00` for channel A, `01` for channel B, and so on). In this example, because the interface has two channels, one channel is `00` and the other is `01`.
   - `Vendor ID`—shows the device's vendor ID; for the interface, this is the same for both channels. For all the interface the ID is `0x1000`.
   - `Device ID`—shows the device ID; for the interface, this is the same for both channels. For the interface, the ID is `0x0030`.
   - `Slot #`—identifies the physical card slot in the server where the interface is installed; for the interface, this is the same for both channels. In this example, the interface is on the system board therefore the slot number is `xx`.
   - `Path`—identifies the device's path; for the interface, this is the same for both channels. In this example, the interface path is `Acpi(HWP0002,200)/Pci(1|0)` for channel A and `Acpi(HWP0002,200)/Pci(1|1)` for channel B.

   Using the interface information from the example above, the pieces of information that, combined, tell you this is an interface are the following (shown in **bold**, for highlighting purposes):

```
00   20   01   00  0x1000  0x0030   xx  Acpi(HWP0002,200)/Pci(1|0)
00   20   01   01  0x1000  0x0030   xx  Acpi(HWP0002,200)/Pci(1|1)
```

   The vendor (**0x1000**) and device (**0x0030**) are the IDs for a interface. Of the devices with those IDs, this device has two channels (Fnc # of **00** immediately followed by Fnc # of **01**). Also, this interface has a non-numeric (XX) slot # indicating that it is on the system board.

2. To obtain the controller handle for the interface, enter the `devtree` command from the EFI Shell prompt.

   A tree of all EFI-capable devices installed in the server displays. The output displays as follows:

```
Shell> devtree

Device Tree

Ctrl[04]
Ctrl[0A] Acpi(HWP0002,0)
Ctrl[12] Usb Open Host Controller
Ctrl[13] Usb Open Host Controller
Ctrl[14] Acpi(HWP0002,0)/Pci(1|2)
Ctrl[15] PCI IDE/ATAPI Controller
Ctrl[48] DW-28E
Ctrl[83] FAT File System [FAT32] 118 MB
Ctrl[16] Acpi(HWP0002,0)/Pci(3|0)
Ctrl[49] Acpi(HWP0002,0)/Pci(3|0)/Mac(00306E4C4F1A)
Ctrl[0B] Acpi(HWP0002,100)
Ctrl[17] LSI Logic Ultra320  Controller
Ctrl[18] LSI Logic Ultra320  Controller
Ctrl[19] Acpi(HWP0002,100)/Pci(2|0)
Ctrl[4B] Broadcom NetXtreme Gigabit Ethernet (BCM5701)
Ctrl[0C] Acpi(HWP0002,200)
Ctrl[0D] Acpi(HWP0002,400)
Ctrl[0E] Acpi(HWP0002,700)
Ctrl[1A] Acpi(HWP0002,700)/Pci(1|0)
Ctrl[1B] Acpi(HWP0002,700)/Pci(1|1)
Ctrl[36] 16550 Serial UART Driver
Ctrl[37] VT-100+ Serial Console
Ctrl[31] Primary Console Input Device
Ctrl[32] Primary Console Output Device
Ctrl[30] Primary Standard Error Device
Ctrl[1C] Acpi(HWP0002,700)/Pci(2|0)
Ctrl[32] Primary Console Output Device
Ctrl[30] Primary Standard Error Device
Ctrl[33] Acpi(PNP0501,0)
Ctrl[34] 16550 Serial UART Driver
Ctrl[35] VT-100+ Serial Console
Ctrl[31] Primary Console Input Device
Ctrl[32] Primary Console Output Device
Ctrl[30] Primary Standard Error Device
Ctrl[44] VenHw(904EFCF0-F0A8-11D4-B4CA-303031303833)
Ctrl[46] VenHw(D65A6B8C-71E5-4DF0-A909-F0D2992B5AA9)
```

In the above example, the interface information is shown **highlighted bold**. You can tell the information is for the interface because the path on the first line—`Acpi(HWP0002,100)`—is the path from the information displayed by the `info io` command. The next two lines are for the interface two channels, one line for each channel (they contain the interface description [`LSI Logic Ultra160 Controller`]). Note the value shown for `Ctrl`—`17` and `18`—at the beginning of each of those lines; this is the **controller's handle** for each channel. You need to know it for the next step.

NOTE: The controller handle values will change on every boot.

3. To obtain the EFI driver handle for the interface, enter the `drvcfg` command at the EFI Shell prompt.

   A list of all EFI-capable configurable components in the server is displayed. The output can display as follows:

```
Shell> drvcfg

Configurable Components
Drv[3D] Ctrl[15] Lang[eng]
Drv[3F] Ctrl[19] Lang[eng]
Drv[45] Ctrl[17] Lang[eng]
Drv[45] Ctrl[18] Lang[eng]
```

This listing shows which driver controls which device (controller). In the above example, the interface information is shown highlighted **bold**. You can tell the information is for this interface because the values shown for `Ctrl—17` and `18`—are the controller's handles for the interface two channels (from the information displayed by the `devtree` command).

NOTE: The EFI driver's handle values change on every boot.

TIP: From this command (`drvcfg`) record these two pieces of information for *each* channel of *each* interface for parameters to be changed:

- `Drv` (the EFI driver handle)
- `Ctrl` (the controller handle)

4. Using the information (the driver handle [`Drv`] and the controller handle [`Ctrl`]) from the `drvcfg` command, start the EFI Setup Utility for *one* channel of *this* interface.

   At the EFI Shell prompt, enter:

   `drvcfg -s drvr_handle cntrl_handle`

   where

   - *`drvr_handle`* is the handle of the driver that controls the channel whose ID you want to display or change
   - *`cntrl_handle`* is the handle of the controller for the channel whose ID you want to display or change

   Continuing the example for *channel A* of *this* interface, enter:

   `drvcfg -s 45 18`

5. The EFI Setup Utility starts and its main menu displays, showing a list of all the EFI capable interfaces in the server.

TIP: To move the cursor in the EFI Setup Utility, you can use these keys:

- Arrow keys: ↑ ↓ ← →
- Alternate keys:

  H = left

  J = down

  K = up

  L = right

  I = home

  O = end

Move the cursor to highlight the channel of the interface; and press **Enter** (to determine which channel of the interface to highlight, match the `PCI Bus`, `PCI Dev`, and `PCI Func` values on this screen to the `Bus #`, `Dev #`, and `Fnc #` values from the `info io` command).

CAUTION: Do **not** select the `<Global Properties>` option on the main menu.

6. The Adapter Properties screen for this channel of the interface displays. Make sure the utility is running for the channel of the interface by comparing the values shown for `PCI Bus`,

`PCI Device`, and `PCI Function` to the `Bus #`, `Dev #`, and `Fnc #` values from the `info io` command.

△ **CAUTION:** Do **not** change the value for **any** of these fields on the Adapter Properties screen:

- `Auto Termination`
- `Parity`
- `Bus Scan Order`
- `Spinup Delay (Secs)`

Changing any of these fields can cause unpredictable results.

CAUTION: Do **not** change the value for **any** of these fields on the Device Properties screen:

- `Scan Id`
- `Scan LUNs > 0`
- `Disconnect`
- `Timeout`
- `Queue Tags`
- `Format`
- `Verify`

Changing any of these fields can cause unpredictable results.

---

7. Display (and optionally change) any parameters listed below for the channel of the interface, or restore its parameters to their default values.
   - ID
   - Maximum data transfer rate
   - Bus width
   - Whether the interface is bootable (driver support)
   - Avoid bus resets (secondary cluster server)
   - Restore Defaults
8. Use the arrow keys to navigate to the appropriate parameter.
9. Use the plus (**+**) and minus (**-**) keys to scroll through the values until the value you want displays.
10. To exit the Adapter Properties screen, press **Esc**. You are given these choices:
    - Cancel the exit from the screen (to stay in the Adapter Properties screen for the channel of the interface)
    - Save the changes you made and exit the screen
    - Discard the changes you made and exit the screen
11. Move the cursor to the action (`cancel`, `save`, or `discard`) you want to take; press **Enter**.

    If you selected `cancel`, you remain in the Adapter Properties screen for the channel of the interface. You can still change the channel's parameters listed above.

    If you selected `save` or `discard`, you go to the EFI Setup Utility main menu.

△ **CAUTION:** Do *not* select the `<Global Properties>` option on the main menu.

---

12. Press **Esc** to exit the main menu and the EFI Setup Utility.
13. Select the option for exiting the utility.
14. When prompted, press **Enter** to stop the interface; you are at the EFI Shell prompt.
15. At the EFI Shell prompt, enter the **`reset`** command. The server starts to reboot. This is **required** to cause the new setting.

Using the Boot Option Maintenance Menu

This menu enables you to select console output and input devices as well as various boot options.

In all the following sections, the menus enable the following functionality:

- Help to display the help available for the command
- Exit to return to the main Boot Options Maintenance menu
- Enter to select an item after using the arrow keys to highlight the item
- Save Settings to NVRAM to save your changes

NOTE: The options shown here are examples. Your server may have different options available based on the server configuration and installed hardware components.

EFI Shell Paths

All devices in the server blade are represented by paths in the EFI Shell. To identify the correct socket or disk drive, use the following tables.

Table 33 Server Blade Sockets

Socket	Path
1 PCI	Acpi(HWP0002,400)/pci(0|0)
2 PCI	Acpi(HWP0003,400)/pci(0|0)

Table 34 Server Blade Drives

Drive	Path
Disk	Acpi(HWP0002,100)/Pci(1|0)/(Pun0,Lun0)
Disk	Acpi(HWP0002,100)/Pci(1|1)/(Pun0,Lun1)
Removable Media Boot	Acpi(HWP0002,0)/Pci(1|0)/Usb(0,0)/HD

Boot From a File

Use this option to manually run a specific application or driver.

NOTE: This option boots the selected application or driver one time only. When you exit the application, you return to this menu.

This option displays the file systems that are on your server or workstation and lets you browse these file systems for applications or drivers that are executable. Executable files end with the `.efi` extension. You can also select remote boot (LAN) options that were configured on your network.

For example:

```
Boot From a File. Select a Volume

    NO VOLUME LABEL [Acpi(HWP0002,0)/Pci(2|0)/Ata(Primary,Master)/CDROM
    CD_FORMAT [Acpi(HWP0002,0)/Pci(2|0)/Ata(Secondary,Master)/CDROM
    Removable Media Boot [Acpi(HWP0002,500)/Pci(2|0)/Ata(Secondary,Master)
    Load File [EFI Shell [Built-in]]
    Load File [Acpi(HWP0002,0)/Pci(3|0)/Mac(00306E4C4F1A)]
    Exit
```

In this example:

- NO VOLUME LABEL is a hard drive. When you format a hard drive, the EFI tools provide an option to LABEL the disk. In this example, the volume was not labelled.
- CD_FORMAT is the label created for the disk currently inside the DVD drive.

- Removable Media Boot allows you to boot from a removable media drive (CD/DVD drive). This option does not support booting from a specific file on a specific removable media disc.
- The two Load Files are the EFI Shell and the LAN.

Add a Boot Option

Use this option to add items to the EFI boot menu.

This option displays the file systems that are on your server and lets you browse these file systems for applications or drivers that are executable. Executable files end with the `.efi` extension. You can also select remote boot (LAN) options that were configured on your network. The option you have selected will be added to the EFI boot menu.

If you add a new drive to your server, you must manually add its boot options list if you want to make it a bootable device.

When adding a boot option that already exists in the Boot Manager list of boot options, you can choose whether to create a new option or modify the existing one. If you:

- Choose to modify an existing option, you may change the boot option name and/or add boot option arguments to the existing option.
- Create a new boot option for an already existing option, multiple instances of the same boot option exist.

For example:

```
Add a Boot Option. Select a Volume

NO VOLUME LABEL [Acpi(HWP0002,0)/Pci(2|0)/Ata(Primary,Master)/CDROM

    Removable Media Boot [Acpi(HWP0002,0)/Pci(2|0)/Ata(Secondary,Master)
    Load File [EFI Shell [Built-in]]
    Load File [Acpi(HWP0002,0)/Pci(3|0)/Mac(00306E4C4F1A)]
    Exit
```

In this example:

- Most of the items are the same options in Boot From a File.
- NO VOLUME LABEL is a hard drive. You can search through the disk for bootable applications to add to the Boot Manager list of Boot options.
- Removable Media Boot treats the Removable Media (generally a CD) as a bootable device.
- Load File EFI Shell adds a new instance to the EFI Shell. Load File with the MAC address adds a network boot option.

Delete Boot Option(s)

Use this option to remove boot options from the EFI boot menu.

NOTE: This does not delete any files, applications or drivers from your server.

This option displays a list of boot options that are configured on your server. The names match the options on the main Boot Manager menu (above).

If you remove a drive from your server, you must manually delete it from the boot options list.

- To delete an item from the list, use the arrow keys to highlight the item and press **Enter**.
- To remove all of the entries from the EFI boot menu, select Delete All Boot Options. This setting may be used as a security device on servers that are accessed remotely.

Change Boot Order

Use this option to change the order of boot options. The order in which options are listed in the EFI boot menu also reflects the order in which the server attempts to boot. If the first boot option fails, the server tries booting the second, then the third, and so forth, until a boot option succeeds or until all options have failed.

For example, if you normally boot using a configuration on your LAN but would like to boot from a local hard drive if the LAN is unavailable, move the LAN boot option to the top of the list, followed by the hard drive boot option.

The menu lists boot options that currently exist in the main Boot Manager menu. Change the priority of the items by moving them up or down in the list:

- Press **U** to move an option up.
- Press **D** to move an option down.
- Select Save Settings to NVRAM to modify the order in the Boot Manager menu, which modifies the order that the Boot Manager attempts to boot the options.
- The items at the bottom of the screen are descriptions of the selected option.

For example:

```
Change boot order. Select an Operation

    EFI Shell [Built-in]
    Current OS
    Save Settings to NVRAM
    Help
    Exit

    VenHw(D65A6B8C-71E5-4DF0-A909-F0D2992B5AA9)
    Boot0000
```

Manage BootNext Setting

Use this option to run the selected boot option immediately upon entering the main Boot Manager menu. This option is useful for booting an option that only needs to be booted once, without changing any other setting in the main Boot Manager menu. This is a one-time operation and does not change the permanent server boot settings.

This option displays the file systems that are on your server and lets you browse these file systems for applications or drivers that are executable. Executable files end with the `.efi` extension. You can also select remote boot (LAN) options that were configured on your network.

To restore the default boot next setting, select **`Reset BootNext Setting`**.

For example:

```
Manage BootNext setting. Select an Operation

    EFI Shell [Built-in]
    Current OS
    Reset BootNext Setting
    Save Settings to NVRAM
    Help
    Exit

    VenHw(D65A6B8C-71E5-4DF0-A909-F0D2992B5AA9)
    Boot0000
```

Set Auto Boot TimeOut

Use this option to set the amount of time the server pauses before attempting to launch the first item in the Boot Options list.

For example:

```
Set Auto Boot Timeout. Select an Option
    Set Timeout Value
    Delete/Disable Timeout
    Help
    Exit
```

Interrupting the timeout during the countdown stops the Boot Manager from loading any boot options automatically. If there is no countdown, boot options must be selected manually.

- To set the auto boot timeout value, in seconds, select **`Set Timeout Value`** and enter the desired value.
- To disable the timeout function, select **`Delete/Disable`** Timeout.

NOTE: When this option is selected, the server does not automatically boot. The server stops at the EFI boot menu and waits for user input.

Select Active Console Output Devices

Use this option to define the devices that display output from the system console. This list normally includes the VGA monitor and a serial port for directing output to a terminal emulation package.

NOTE: Multiple consoles are not supported for HP-UX or Windows (use the Smart Setup CD to switch between COM A and the iLO 2 MP on Windows systems).

For example:

```
Select the Console Output Device(s)

  Acpi(PNP0501,0)/Uart(9600 N81)/VenMsg(PcAnsi)
  Acpi(PNP0501,0)/Uart(9600 N81)/VenMsg(Vt100)
* Acpi(PNP0501,0)/Uart(9600 N81)/VenMsg(Vt100+)
  Acpi(PNP0501,0)/Uart(9600 N81)/VenMsg(VtUtf8)
  Acpi(HWP0002,700)/Pci(1|1)/Uart(9600 N81)/VenMsg(PcAnsi)
  Acpi(HWP0002,700)/Pci(1|1)/Uart(9600 N81)/VenMsg(Vt100)
* Acpi(HWP0002,700)/Pci(1|1)/Uart(9600 N81)/VenMsg(Vt100+)
  Acpi(HWP0002,700)/Pci(1|1)/Uart(9600 N81)/VenMsg(VtUtf8)
* Acpi(HWP0002,700)/Pci(2|0)
```

* indicates a currently selected device.

This menu is identical to Console Error Devices. The server blade does not support different configurations for Output and Error console. For correct operation:

- When changes are made to either Output or Error console menus, the identical change must be made in both menus.
- When changing serial devices, changes must be made to Output, Input, and Error menus for proper operation.

Table 35 Console Output Devices

To select:	Choose:
iLO 2 MP Serial Console	Acpi(HWP0002,700)/Pci(1 | 1)/Uart(9600 N81)/VenMsg(Vt100+)

- Each option is identified with an EFI device path. Not all options are available, depending on the configuration of the server and the options purchased. Device paths might differ slightly on different product models.
- On both serial device examples, UART 9600 indicates the current baud rate of the serial device (can be changed with the EFI Shell baud command), VenMsg Vt100+ is the current emulation type (several different terminal emulation protocols are supported, see list above).
- Only one terminal emulation type (PcAnsi, Vt100, and so on) can be selected for each serial console, but multiple serial consoles can be selected at a time.

Select Active Console Input Devices

Use this option to define the devices that are used to provide input to the system console.

This option displays the console devices on your server. This normally includes a standard keyboard and mouse, and a serial port for receiving output from a terminal emulation package on a laptop. Several different terminal emulation protocols are supported.

- When changing serial devices, changes must be made to Output, Input, and Error menus for proper operation.

NOTE: Some Operating Systems support multiple input devices, such as a simultaneous serial and keyboard input. See your OS documentation to determine how many consoles are supported with your server.

For example:

```
Select the Console Input Device(s)

  Acpi(PNP0501,0)/Uart(9600 N81)/VenMsg(PcAnsi)
  Acpi(PNP0501,0)/Uart(9600 N81)/VenMsg(Vt100)
* Acpi(PNP0501,0)/Uart(9600 N81)/VenMsg(Vt100+)
  Acpi(PNP0501,0)/Uart(9600 N81)/VenMsg(VtUtf8)
  Acpi(HWP0002,700)/Pci(1|1)/Uart(9600 N81)/VenMsg(PcAnsi)
  Acpi(HWP0002,700)/Pci(1|1)/Uart(9600 N81)/VenMsg(Vt100)
* Acpi(HWP0002,700)/Pci(1|1)/Uart(9600 N81)/VenMsg(Vt100+)
  Acpi(HWP0002,700)/Pci(1|1)/Uart(9600 N81)/VenMsg(VtUtf8)
```

* indicates a currently selected device.

- Each option is identified with an EFI Device path. Not all options will be available, depending on the configuration of the server and the options purchased. Device paths may differ slightly on different product models.
- On both serial device examples, UART 9600 indicates the current baud rate of the serial device, VenMsg Vt100+ is the current emulation type. Several different terminal emulation protocols are supported (see list above).
- Only one terminal emulation type (PcAnsi, Vt100, and so on) can be selected for each serial console, but multiple serial consoles can be selected at a time.

Table 36 Console Input Devices

To select:	Choose:
iLO 2 MP Serial Console	Acpi(HWP0002,700)/Pci(1 | 1)/Uart(9600 N81)/VenMsg(Vt100+)

Select Active Standard Error Devices

Use this option to define the devices that display error messages from the system console.

This menu is identical to Console Output Devices. The server blade does not support different configurations for Output and Error console. For correct operation:

- When changes are made to either Output or Error console menus, the identical change must be made in both menus.
- When changing serial devices, changes must be made to Output, Input, and Error menus for proper operation.

Using the System Configuration Menu

The System Configuration Menu (on servers with EFI firmware version 2.0 or higher) includes the following options:

- The Security/Password Menu lets you change the administrator and user passwords
- The Advanced System Information Menu displays information about server and component configuration
- Set System Date lets you modify the system date
- Set System Time lets you modify the system time

- Reset Configuration to Default lets you restore server settings to their original configuration
- Help displays additional information about the available options
- Exit returns to the EFI startup menu

Security/Password Menu

You can set administrator and user passwords to provide different levels of access to the system firmware:

Resetting Passwords

If you forget your passwords, they can be reset using an iLO 2 MP command.

- Run the `MP BP` command to reset the iLO 2 MP and reset the password.

NOTE: You can only run this command when directly connected to the server blade.

Integrated Lights Out 2 Management Processor

The integrated Lights Out Management Processor (iLO 2 MP) is an independent support system for the server. It provides a way for you to connect to a server and perform administration or monitoring tasks for the server hardware.

The iLO 2 MP controls power, reset, Transfer of Control (ToC) capabilities, provides console access, displays and records system events, and displays detailed information about the various internal subsystems. The iLO 2 MP also provides a virtual front panel used to monitor server status and the state of front panel LEDs. All iLO 2 MP functions are available through the LAN and the local RS-232 port.

The iLO 2 MP is available whenever the server is connected to a power source, even if the server main power switch is off.

Access to the iLO 2 MP can be restricted by user accounts. User accounts are password protected and provide a specific level of access to the server and iLO 2 MP commands.

Multiple users can interact with the iLO 2 MP. From the MP Main Menu, users can select any of the following options: enter iLO 2 MP command mode, enter console, view event logs, view console history, display virtual front panel, enter console session, or connect to another iLO 2 MP. Multiple users can select different options from the MP Main Menu at the same time. However, iLO 2 MP command mode and console mode are mirrored, The iLO 2 MP allows only one user at a time to have write access to the shared console.

For a complete explanation of configuring the iLO 2 MP and using the iLO 2 MP commands, see the *HP Integrity iLO 2 Operations Guide*.

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